3 letter words with viral

The history of chemistry history is strongly linked to human development because it is crime from all changes in material and related theories. Chemistry history is often related to the history of chemistry and depends on their citizenship or political tendency- based on achievements arose in a given field or by a particular nation to a maximum or a minimum extent. Chemical science emerged in the 17th century from the study of popular chemistry with many of the scientists of the time. The basic principles of chemistry are first manifested in the work of British scientist Robert Boel: Defeat The Chemast (1661). As such, chemistry begins as a rule of denial of mass protection law and the phlogast theory, with the work of his discoveries of French Beclère Lawasier and Oxygen a century later. The early advancasthi principle of chemistry skills (which for conformity of the entologologists with the modern man's principle) is the action of fire. Indications that some of the Homo Aerctos over 500,000 years ago achieved this success which is still one of the most important technologies. It just doesn't give light and heat at night and help protect against wild animals. He also prepared for the food that was cooking . It consists of less-than-just-able sukshamjiu and is more easily system. It improves low death rates and living conditions overall. The fire also allowed food and especially meat and fish to be better safe and smoking. From that time there was a strong link between the kitchen and the first chemical laboratories that black ammo was discovered by Chinese cooks. Finally it was necessary for the future development of metalling, ceramics and glass and the most chemical pocasis. As chemistry scanquethi Greek philosopher Aristottthought that the substances were made up of four elements: earth, air, water and fire. At the same time there was another parallel present, attomesem, which postuleted that it was made of the material atom, indimitable particles that could be considered the minimum unit of the case. The principle which was not popular with The Magnets, the Greek philosopher of Abdera, was not used in Europe in western culture. However, it had its perus (including Lwecretio) and remained present till the beginning of modern age. 3rd and . One between C and 16th century. C was dominated by chemistry chemistry. The best known research of The Camea was aimed at searching for the stone of the philosopher. The unrealistic way of gold is the ability to change metals. New chemicals and methods for separation of chemical elements were developed in alchemical research. Thus, the primary pillars for the development of the future of the experiment chemistry were set. Such as for the development of chemistry begins to sixteenth and seventeenth centuries. At that time, the behavior and characteristics of the gasses were studied, establishing measurement techniques. Gradually the concept of one element was developed and improved as an early substance that could not be broken in others. Also at that time the flogast theory was developed to explain the process of the dahan. After the 18th century, chemistry has been the characteristic of an experiment. Careful measurement methods are developed that allow a better knowledge of certain phenomena, such as case-finding, the discovery of lawasier oxygen and finally laying the basic pillars of modern chemistry. After the principles of Whatalsem and Dahan were considered to be the beginning of organic chemistry another important debate captured the chemistry. The essential difference between whattlesam and organic and non-organic matter. This theory assumes that organic matter can only be created by those who can present this fact as a attributed vatulas in their lives. The basis of this assumption was the difficulty of getting organic matter from inorganic advances. This debate was revolution when Frederick W'hler mistakenly discovered how urea can be found out from the amunim canonati in 1828 that organic matter can be chemically produced. However, the ranking in organic and non-organic chemistry is maintained today, first primarily capturing carbon compounds and second of other elements compounds. The engines for organic chemistry development were initially intrigued about the products present in the living people (perhaps hoping to find new drugs) and color or color composition. Last get up after the discovery of aniline by a precious and the composition of an artificial die by Perqin. Then included new materials such as plastic, adhesumarket, liquid crystals, futusanatary etc. After World War II, the major raw materials of the organic chemical industry had given Europe great importance in developing this part of science and the fact that there are no major deposits of alternatives as coal in Europe. With the end of World War II In the chemical sector, Us weight classical organic chemistry becomes increasingly petrochemicals we know today. One of the main reasons was the most convenient of the great variety of products found in change and oil. The Meidaati Tablin 1860 scientists had already discovered more than 60 different elements and set their atomic stake on a large scale. He felt that some elements had similar chemical properties so he named each group similar elements. In 1829, Chemistry J.W. D'benreiner organized a factor rating system in which they were grouped into three so-called groups. The chemical characteristics of the elements of a tread were similar and their physical characteristics differed in a systematic manner with their atomic mas. A little later, Awanoch Mendeleo in Russian-Camera developed a round table of elements in his growing order of nuclear people. He started the elements of vertical columns with lighter ones, when they reached one element which had characteristics of another element like them, another column began. Complete your table by adjusting the elements in horizontal rows to The Mandeleo soon. His system allowed him to accurately predict the characteristics of the Encorunad Aymantaus so far. His great likeness as element inosoguad by Mendelio is finally being applicable today even today that this system of management got general approval. The development of nuclear theory throughout the 19th century chemistry was divided among followers of John Dalton's nuclear theory and those who did not like Wilhelm Ostwald and Ernest Mac. The most determined drivers of nuclear theory were Amedo Oogodreu, Ludwig Boltzman and others made great breakthroughs in understanding the behavior of the gasses. This controversy was ended with Albert Einstein explaining the Hebrew influence of 1905 and Jean-Parran's experiences on it. Many researchers had worked under nuclear pre-preparedbefore solving the conflict. Swante Arhinios had investigated the interior structure of the atom by recommending his theory of Tain. His work was done after Ernest Rutherford who opened the doors to the development of the first model of atom that would lead to The Nuclear Model of Niels Bohr. Currently, the study of the structure of the atom is not considered to be the branch of the phex and chemistry. Introduction To Ishaq Esimoo's Speciality For Anyone Interested In Creating This Short History Of Comprehensive, Convenient and Warning Performance Chemistry The Esimoo began to change the nature of matter in a bad way when from that time on marks the evolution of this field of knowledge, in modern times, at which point, through the development of methodologyal rectitude and the development of the study field of Damansaonang, it is fully formed as scientific discipline. Chapter 1 Intaquatikantant: 1. Stone and Fire 2. Metals 3. Greece: Elements 4. Greece: atoms1 The stones and the first men to use the fire is what they got it. A good size animal's fhimmer or a branch extracted from a tree were fantastic clubs. So , what better than stone ? Over the centuries, Adam's men learned to make stones, giving them a side or shape that would allow them to be easily ruined. The next step was to attach a shaded wood SPL mastol stone to this purpose. But, anyway, his digging stones remained stone, and his wood remained wood edited out. However, there were times when things changed. The Asmani lightning could set a forest on fire and its to reduce it in the pile of the assay and the palwaris, which in the same place it does not remember the trees before. The meat that was made by hunting was damaged and smelled bad. And fruit juice can be sour in time or encourage surprises to drink. These kinds of changes in the nature of matter (accompanied, men sometimes discovered, as fundamental changes in their structure) are an objection to the science that we have called chemistry. And a fundamental change in the nature and structure of a substance is chemical change. The possibility of knowingly gaining benefit from some chemical phenomena came true man was able to create and maintain fire (known in historical terms as the discovery of fire). After finding it man became a practical chemist in desstang methods for wood or other burning garbage materials-mixed with air at a considerable speed and thus generating light and heat, along with the rah, smoke and vanps. The wood had to dry and wash a part to use as a tindinr; Some methods such as friction-like to reach the temperature that had to be used, and so on. Heat produced by fire is serviced to create new chemical change: can be cooked, and its color, texture and taste changed. Clay can be shaved in the form of brick or containers. And finally, they were able to make ceramics, wennashad pieces, and Glass items. The first materials used by man were universal, in the sense that they are found anywhere: wood, bones, hides, stones... The stone of all of them is the most durable, and the stone tools are the documents that we have to know for a long time now. That's why we're talking about the age of stone. When the man was still with this stone at that time, some 8,000 years BC, in the area we now know as middle east, a revolutionary change was introduced into food production: by now man was like another animal, food was achieved by hunting. But from that moment they learned to care for animals and, thus always eating too much and safe. And, more importantly, how they learned to increase plants. The population has increased significantly as a result of the hosbangandahing and agriculture of these animals. Agriculture housing space needs to be faxed, and therefore our pooruratis built houses, gradually developed cities first. This evolution literally determines the beginning of civilization, because the word Latin comes from the term city. During the first two centuries of this new-year-long civilization, a feature of stone equipment remained material, although new manufacturing techniques were discovered. This new age of stone or modern time stone was characteristics by careful polishof stone. The pot had participated in another element development. The successes of the modern time stone, the upper spread outside the Middle East region. Around 4000 BC, the characteristics of this culture appear in Western Europe. But until then things were in the Middle East, Egypt and Sumeria, which is now Iraq, and for further changes. Man was starting to use relatively new material. Encouraged by the useful features of these materials, they learned to deal with the discomfort of a careful search and complex procedure filled with contradictions. These materials are known as metals, to find a word that itself expresses change, because it probably means the Greek word. The first metals of metals should be in the form of a sour shape. And they were definitely pieces of the tanbe or gold, because they are one of the few metals that are free in nature. The redish color of the tanbe and the yellow color of gold must be dyed to its attention, and the metal glow, more beautiful and mighty than the surrounding clay, is the class Among the common stones they used to push them to catch . Of course, the first use given for metals was ornamental, an end for which almost something was found. Colorful Pedrichallas, Pearls of the Sea... However, metals have an advantage over other hit objects: they are smooth, meaning that they can break without flat (stones, on the other hand, pullovers, and wood and bones chip and breaks). Its speciality was discovered by the occasion, undoubtedly, but this one certain artistic sense should not be long between time to hit the material to hit the material to the lead man his appeal will highlight more. The paper makers felt that this metal could be equipped with cutting edge like stone instruments, and the edge achieved was placed in situations where stone instruments were Minisrmelkollam. Later he saw how a well can be sharpened more easily than a stone edge on the edge of the storm. In preparation of the only lack of the tana and in the preparation of ornamental items, further spread prevented its use. The water was more than when it was discovered that it could be achieved from waterstones. How this discovery was created, or where or when, is something we don't know and will probably never know. We can assume that the discovery was made of wood fire light on the stone bed where there were some pieces of anything. Then, in the middle of the hell, small drops of shiny water will stand. Perhaps it happened many times before any observation that if blue stones were found and heated in wood fires, the glass was always produced. The final discovery of this fact may be some 4,000 years BC, located on the peninsula in southern Egypt and in the mountainous region east of Sumeria, now Iran. Or maybe it happened at the same time in both places. In any case, the most advanced centers of the culture of the tanbe had enough aperture to be used in the toolsing. Bc, aged about 5,200 years, has found a fwrong pan in an Egyptian tomb. In the third Milliname BC, a difficult type of particular lying of the oil was discovered, in the form of thermal sand and tin minerals, almost certainly the accident (Picture 1). Its blending (a term of two metal mixtures) was called bronze for the tin and the tin, and by 2000 BC it was already being used in the making of weapons and ammunitions. Bronze instruments found at the shrine of Egyptian Pharaoh Itetis About 3,000 years BC. The best historical event of bronze age was the Tarjun War, in which bronze weapons and the goller fired with this metal top in their enemies. An army without metal weapons was infront of bronze soldiers, and the forgings of that time enjoyed a similar prestige to our atomically. They were powerful men who always held a place among kings. And his handiwork was dinoted in the knowledgeof the mythical creatures of Hepaastaus . Even today-and-not-by-chance-Smith, or some of its equivalents, is the most common name among the people of Europe [1]. Fate was going to redo the bronze-age man, who discovered an even harder metal: Iron. Unfortunately it was very low and valuable to be able to use it in large quantities of coach making. Surely, already the only sources of iron were pieces of meteorites, naturally very small. Also, there seemed to be no procedure for extracting iron from the stone. The problem is that iron is bound much more strongly, than it is, compared to the amount of iron. More intense heat is needed to melt iron than melt edify ing. Wood was not enough for this purpose, and it was necessary to use charcoal fire, more severe, but which is burning only in good vantilysion conditions. The secret of iron smleting was finally on the east end of Asia, and apparently as a BC of 1,500 years at a time initially. The Tithas, which had built a powerful empire in the small part of Asia, were the first to use iron in the tools. The letters are saved that a Hittite king sent to his viceroy, which featured in an iron rich hill yeast area, approximately 1280 BC, and which give definitive details about the production of metal. Pure iron (fake iron) is not very difficult. However, a device or iron coach improved by giving a substantial amount of charcoal blended with this metal. This adulteration-in which we call the increase diff of steel like a skin on the items under treatment and present them with higher stiffness than the best bronze, keep them fast for longer. Steel manufacturing marks the key approach in iron metaling discovered in the Hittite area. Armed with an army guard and hard iron can armed with bronze with a high chance of defeating another army. We are in the age of iron, the cmarkablifagree in iron and 1. Adam Carabalyas Appropriate to reduce different minerals. The kaaper oven (a) has one on fire in a puppet. Iron deficiency (B) needs more heat, and to get it the charcoal was full of furniture, oxygen supplied by the dion. An ancient Greek tribe, equipped with iron weapons, attacked it around 1100 BC, the Greek peninsula, and gradually defeated the Mecanian people who, despite their more advanced civilization, had only bronze weapons. Other groups of Greeks admitted the canaan sings of iron weapons. They were those who played such a vital role in the first books of the Bible . Before them, they were able to prepare their iron weapons, as long as they were just lying in a state of disservice under the orders of Sa'aal. The best quality is the first iron-equipped army that allowed him, 900 years BC, to create a powerful empire. Before identifying the wonderful days of Greece, the art of the world has made it to an extraordinary state instead of development. This was especially true in Egypt, where priests were very interested in the ways of demand and protected the human body after death. Egyptians were not only metallergic experts but knew that the process of producing mineral scars and plant jus and amions [2]. By some principle, the word Khemayya is crude to its country by the name Ofegyptian: (this name is also used in the Bible, where, in king James's version, it changes to ham.) Hence, Khemayamaya may be Egyptian art. The second theory, today, somewhat further helped, is the kaemaya from the Greek kaomaus, which means that the juice of a plant will be therefore the art of the juice of the kaemaya juice. The above juice can be changed by metal, so that the word metalising will mean art. But whatever its origin, The Chemistry is an example of our term. Greece 3: Elements around 600 BC, subtle and intelligent Greek people gave their attention to the nature of the universe and its material structure. Greek scholars or philosophers (the premies of wisdom) were more interested in why technology and things than manual sions. In short, they were the first to clash with what we now say chemical principles according to our news. The first perspectives were stories (approximately 640-546 BC). Perhaps greeks before greeks, and even other men, are able to meditation correctly and deeply on this meaning Change in the nature of matter, but their names nor their idea has come to us. Stories were Greek philosophers born in Mens (Kenya), an area located in The Aigen, West Coast, what is Turkey now. The following question should be raised: Can one substance be converted into another, like a piece of water can be converted into a red tan, what is the nature of the substance? Is it a stone or a taanba? Or maybe it's both at the same time? Can any kind of action be converted by another, so that all matter will be only different aspects of a basic case? Chitra 2. Alchemist physics includes four elements of Aristotle, along with the Protoyosis and the Heavenly Aquawalanakas, combining the same symbols to planets and 105 metals. It is original by Atkirnan Robert Fld (1574-1637), who changed back to the scientific spirit of his time and set out in search of the hidden. The answer to such a last question was yes, because such a basic command and simplicity can be introduced into the universe. It was then necessary to decide whether the main case or element was [3]. Such a decision is that this element was water. All the substances, seem to be found in the largest amount of water. Water surrounds the ground; Look at the permails in the form of steam. Walks across continents, and without it life is impossible. According to stories, the earth was an unlimited flat disc covered by semespahery and floating in the sea. The stories' thesis exists in the existence of an element from which all the matter was later found to be more accepted among philosophers. Not so, however, that this element has to be water. In the following century, in the stories, the astrophile gradually concluded that the sky around the earth was not a symaspheri, but a complete circle. The earth, also karvi, was suspended at the center of the sky set by the circle. Robert Flthe did not accept the concept of Greek salaipan and therefore did not believe that there could be nothing in the space between the earth and the far sky. And the man who knew it happened in part of that gap, it seemed appropriate to assume that the rest had happened in the rest too. Such a reasoning might be that Anaimanas, besides Mens, around it, was the constitution element of the air universe, around 570 BC. He reported that the center was contacted as air, thus configuring water and soil (shape 2) such as the dentist substance. On the other hand, the philosopher Heráclito (approx. 540-475 BC), the neighboring city of Ephesus, took a different path. If the change is that which is to the universe, we should look for the element in which change is the most remarkable thing. This substance, it should be fire, constantly in the atapirvartan, is always different from itself. Pherinissis, Ardoo, presiding over all changes [4]. In the time of Anaimanas, the Iranians attacked the beaches of the Ayoni Sea. After the failure of an attempt at resistance, Persian rule became more cruel, and went into the decline of scientific tradition; But before he ended, The Joonaus immigrants moved this tradition further west. The Pithagoreas de (approximately 582-497 BC), a non-Native of the Ayoni Island, left behind an influential body of education to move to southern Italy in 529 BC, where he dedicated himself to teaching. Empédocles (approximately 490-430 BC), born in Sissi, was a key disciple of The Pithagoras, who also worked about the problem in which the universe was established. The theories suggested by his Ayuni Sea school put him in a compromise, because he could not see how he would decide for one or the other. But why is there a single element? So what if there were four of them? They may be the fire of Heráclito, the air of Anaimanas, the stories and the water of the earth, in which The Empédocles included themselves. Aristot (384-322 BC), the most influential of Greek philosophers, accepted this theory of four elements. They didn't consider elements to be the same substance that they named them. That is, I don't think the water we can touch and feel was really the water element; it's just the most closely related original substance for this element. Aristotl believes the elements as a combination of two pairs of anti-properties: cold and heat, moistness and sowness. The opposite properties could not be found with each other. Thus four different possible pairs are made, each of which will add to the element: heat and increase suhepon fire. Heat and weed, air; cold and dry ground; cold and wet, water. On this scheme he said that every factor is natural for him that went a step further by a large number of specific features that stated. Thus, it is for the general fall of the earth, while the nature of the fire increases. However, the heavenly institutions had characteristics that seemed different from the earth's materials. Instead of being raised or falling, these institutions gave the impression of roaming around the earth in the umt circles. Aristottassumes that the heavens should be made of the fifth element, which he called Ether (a term which means the word For the most special feature of it is their light . As the sky had not changed, Aristotle counted ether as perfect, indefative and non-fiving, which made it very different from the four incomplete elements of the earth. This four-element theory of men's thinking for 2000 years is going on. Although he is now dead, at least as far as science is concerned, he still lives in normal language. For example, we talk about the wrath of elements when we want to express (wind) and expressive violence by the impact of clouds (water) storms. As for the fifth element (ether), it was converted into latin language xabada, and when we talk about the futility of something, then want to show that it is in the purest and most focused state, we are actually the excuse Aristotilyan perfection. 4 Greece: Another important topic of nuclear debate found widespread progress among Greek philosophers: discussion on the exhibition of matters. Two in a stone divide, even less in the sun, stay stone, and each of the resulting pieces can be redistributed. Can these divisions and sub-divisions continue inane lying interminable? Leupapa Junao (approximately 450 BC) has been the first to call into question apparently the natural assumption that no piece of matter, however small, can always be divided into small pieces. Lyopapa has maintained that in the end of the particles may be too small to be further distributed. His disciple The Magnet (approximately 470-380 BC), north of a city of Eigen, continues in the line of thinking. He said that particles that had reached the atom, meaning indimitable, small possible size. This theory, which argues that this case is made up of small particles and is not definitely divided, is called atomesam. The magnets assumed that each element's atom was different in size and shape, and it was the differences that gave them different characteristics. The real substance, which we can see and touch, contains a mixture of different elements nuclear, and can be converted into a substance in the nature of the mixture. All this has been a sure typifying of modernity for us, but it should not be forgotten that The Magnets did not appeal to experiments to make their claims korroborati. (Greek philosophers did not experiment, but the first principles were discussed and came to their conclusions. For many philosophers, and especially Aristot. There was not a bit of division among other children, and they did not accept it. That's why the Atomestock theory became unpopular and was barely taken into account for 2000 years after The Magnet. However, Attomem never died. The Appacoros (342-270 BC) added to their line of thinking, and Appakoreasm has achieved many followers in the following centuries. One of them was roman poet Locrequao Cro (95-55 BC), known only by Lucretio. He exhibited the atomestock theory of The Magnetism and Appacuras in a long poem de Raram Natora (on the nature of things). Consider many of this best warning poem ever written. In any case, while the work of The Magnet and The Apacoros, leaving only a few loose quotations, Locquao's discipline was completely saved, maintaining the results of the atomasam on that day, in which new scientific methods are included in the struggle and led to the final victory. Chapter 2:1. Al-Qahimikontant 2. Arab 3. Awareness in Europe 4. Alchemy1 ended in aristotle, Alexander (a kingdom in northern Greece) won a great Persian empire. Alexander's empire dassophad after his death in BC 323, but the Greeks and The Macdonia maintained control over large areas of the Middle East. Over many centuries (greek period) a fruitful blend of cultures has taken place. Putulima, one of Alexander's generals, established an empire in Egypt whose capital was the city of Alexander. I stood a temple for Patulymi and her son (Patulymi II) (the museum) which we will now call a research institute and a university as the same purpose. Next to it was the largest library of the era built. The Egyptian expertise of applied chemistry was fused and with Greek theory, but this fusion was not entirely satisfactory. In Egypt, the kmayaa was associated with the demand of the sahedran and religious ritual. For Egyptians, the source of all knowledge was from the head of the ibis, the God of Wisdom. The Greeks influenced the egyptians by the height of their knowledge and identified the tahokar t with their hermis and accepted a good dose of Sufism. The ancient Ayoni philosophers had separated religion from science. This new alliance in Egypt was then a serious obstacle to advance knowledge. As The Art of Khimia was very close to religion, simple people often have a sin on those who practice it, to consider them in close company with the followers and knowledge of the secret art. (With this disturbing knowledge of the future, the notomens, with this awesome ability to change material, even with their secrets about the possibility of atonement and excuse punishment of gods, work as models of folklore of priests, magicians and magicians.) Recipients of these errors were often not resentful, but often increased, informed that they increased their power and probably even protected them. After all, who thinks of disturbing the magician? This popular honor or suspicion encouraged The Khemiya practitioners to write their writings using black and mysterious symbulamys. The power sense and the capture of hidden knowledge increased even more with this darkness. For example, there were seven heavenly bodies, because they have constantly changed position and there were seven known metals: gold, silver, tanba, iron, tan, lead and mercury (figure 2). It seemed attractive to meet them, and when gold was generally designated the sun, as silver as the moon, such as Venus, Venus, The Sun and so on. Chemical changes can currently be included in a knowledge-al-agoteological creature. There are still memories at this time. The name of the compound was now called Silver Nitrate lunar castik. This name is already a clear indication of the ancient relationship between deep-cut, silver and moon. The Murree is its current name on planet The Murree. The real old name was Hydrargirgam (Liquid Silver), and the old English name was almost the same in The Quaxallur. This greater or greater conscious darkness serve two unfortunate goals. First, they slowed down growth, as ignored or completely in the working part of the subject—what others were doing, so that they would not be able to profit from mistakes or learn from the willof others. Second, it has allowed the language to be duped on darkness-to present itself as serious workers. The chalya could not be inlove with the world. The first follower of the Greek Egyptian khemaya that we know by name was that we knew about de Makkah (about 200 BC), a population of the Nile. In his writings he used the name 'Magnet', so it is known as the unknown American-the magnet or, sometimes, fake the magnet. Bowling was dedicated to what had become one of The Great Problems of Khimia: one metal to another and, especially, lead or change from iron to gold (transmoitaon). The theory of four elements is considered to be only the difference of different materials in the universe A mixture of elements. This theory of introtomy may prove to be true whether the principle of attomstock is accepted, because elements can be mixed as atoms or as continuous substances. It really seemed appropriate to think that all the elements were exchanged with each other. Apparently water came when it dried, and when it rained when the water came back in shape. Wood, when heated, was converted into fire and steam (a form of air), and so on. Then, consider some changes impossible? It was probably everything about taking the right technology. A redline stone can be converted into brown by a method that was not yet discovered in the first time, who had to use bronze weapons. What is the reason why some of the yellow iron technology has not been converted into yellow gold yet Alexander hasn't discovered in the great times? Over many centuries many chemists worked honestly to find the meaning of creating gold. However, some very simple and more profitable techniques seemed to be in possession and appear to trade in the power and fame that it has provided them. This fraud lasted until the modern era, but I won't be able to deal with it in this book. Although bowling in his writings apparently gives details or techniques to get gold, we can't really consider it a fraud. For example, adulteration is possible for the tanba and zinc, and the brass gain, which has a yellow color like gold, and it is very likely that the preparation of a gold metal for ancient craftsmen was the same as preparing gold. During the Roman rule, the art of Khimia went into decline, with the general decline of Greek knowledge. After the year 100 AD it is practically impossible to find any new partnerships and has participated in a trend to return to the sufi interpretations of the first thinkers as much as possible. For example, around 30 Ce, zodad, an Egyptian-born smuggler, wrote an encyclopedia in twenty eight volumes to cover all the knowledge of the kimia that had been collected in the last five or six centuries and had a very low price. To be exact, you can sometimes find a passage with some newness, such as referring to a zarnic. It also appears that The Zoko Lead Actati has been described as preparation methods and they have become aware of the sweet taste of this toxic compound (which is called chinese leading this day). Fear led to the last death. Roman Emperor Daulatlian is afraid that The Aymaia will successfully sink the cheap gold production and the wobbel economy of the empire. During the period of Zoh, they ordered the destruction of all agreements. Explains the small number of those who have come to us. Another reason is that, with the birth of Christianity, disbelieverthinking fell out of the right. I have been seriously damaged by the 400 Christian riots to the Al-Zique museum and library. Because of its close relationship with ancient Egyptian religion, the art of The Aymamaya became particularly suspicious, practically confidential. In a way, the Greek thinking disappeared from the Roman world . Christianity was divided into sects. One of them was that The Nistoreans had said that its members followed the teachings of The Syrian Monk, Nistorav, who was living in the 20th century. Orthodox Christians in Constantino satiad the Naestoreans, some of whom fled farse in the east. There the Persian salatins welcomed them from the great side (likely to use them against Rome). The Nistoreans took Greek thoughts with them to Persia, including many of the Books of The Khimia, and the rise of their power and the influence around 550. In the seventh century, the Arabs entered this scene. By then they were isolated on their desert island, but now, encouraged by the new religion of Islam established by Muhammad, they spread in all directions. Their victorious forces conquered vast areas of West Asia and North Africa. In 641 they attacked Egypt and took over the entire country after rapid conquers. Faris suffered the same fate in the following years. It was especially in Persia that the Arabs found the remnants of the Greek scientific tradition that they were dying on. This definition can also be added by the fight of great practical importance. In 670, when they were besieged by Constantino (the largest and most powerful Christian city), they were defeated by the Greek fire, a chemical compound that burned with great heat indifference without being able to close with water, and destroyed the Arab fleet's wooden ship. According to tradition, The Callanacos was produced by Kalyancos, a Kitaia practitioner who fled his native Egypt (or maybe Syria) upon the arrival of the Arabs. In Arabic Khimia it became kímiya, pre-default according to LA. The word was finally adopted in Europe as a kimaya, and those working in the field were called al-Kimstis. Term chemistry now apply to the entire chemistry development between 300 BC and about 1600 ashthaar, approximately 2000 years. The chemistry history in Europe between 300 and 1100 is practically a zero. After 650 c. The maintenance and expansion of the Greek-Egyptian cameo was completely in the hands of the Arabs, a situation that lasted five centuries. The remains of this period remain in arabic-related chemical terms: yet, alkali, wine, garrapa, nafata, circus and others. The Arab came to a close at the beginning of its domination. Thus, the most skilled and celebrated Muslim Rasanya Jabir bin Hayan (approx. 760-815), was known as after this in the century of Europe. He lived at a time when the Arab Empire (famous for 1001 nights with Harun al-Rashid) was on the cusp of its glory. There were many of his writings and his style was relatively high-ranking. Many of his books can later be written and attributed to by al-Qaimstas. He described the amonium cloud and taught how to prepare albet alde (the lid carbonite). They are known for the cancer, the most sanccaro acid ansanstoget strong acetic acid. They even developed weak nitrick acid, which in low power, was too much sancnaru. However, the biggest impact of the jabir is the influence of metal transmutation in their studies. It is considered as a metal equivalent to the murkare, because its liquid nature gave it the appearance of having a low proportion of the rekha material. For its part, the silver burning garbage has remarkable property (and also exists on the yellow colors of gold). Jabir thought that different metals were made of a mixture of murree and sulfer, and only some material satiated to form gold would be found to facilitate a mixture of the murree and the sulfer in proportion. The ancient tradition argued that this transmoutaon mufunction substance was a dry powder. Greeks called it xerion, get from the Greek word for dry. The Arabs exchanged it for Al-Aab and in Europe it was finally one. As further evidence that dry and resinated characteristics were attributed to it, we would say that in Europe it was called the rock of the philosopher-wolfaaral. (Remember that even in 1800, a philosopher we now called a scientist. Amazing Ab was inintention to capture other amazing features, and the idea is that it was a cure for all diseases and it could provide survival. That is why we talk about the water of life, and even the chemicals that try to achieve gold can be saved (also ungainly). In fact, in the following centuries, The Chemical developed according to two important parallel routes: a mineral, in which the main purpose was gold, and another medical, in which the primary purpose was treatment. Followers of And with similar knowledge and dignity, they were Persian al-Chemist al-Razi (about 850-925) and later in Europe also known as him. He carefully described his work, for example, Paris Amplasta, and explains what kind of space it can be used to plasticise broken bones. He also studied and described metal serine. The Murree (which was de-consolidated, When heated, and said such albet al de as the third principle in the overall structure of the sulfer (which was jolinschel), because that salt was neither unstable nor became more interested in medicine by Jdinschel. Al-Razi and it gave birth to the medical aspects of the chemical, which continued with the Persian Ibn Sina (979-1037), with its name Ibn Sena was the most important physician between the time of Roman Empire and the origin of modern science. He had learned enough from the failures of centuries and centuries that he was likely to form gold from metals. Although it was, and remains, a chemical al-Khemstas. 3 After Ibn Sena, Europe rapidly rejected the awareness in Arab science. These were difficult days for the Islamic world and were more and more difficult as a result of attacks and the turkish and Mongolian saths, relatively brutal ones. The palm of scientific leadership abandoned the Arabs after three centuries, so that no one could come back, and approve for Western Europe. Their first interaction with the Islamic world was their first peaceful and peaceful contact with the Western Europeanwars. The first crusade ended in 1096 and European Christians captured Jerusalem in 1099. For almost two centuries, the Coast of Syria had Christian rule, in which Muslims like a small island of the sea. Some of the cultures were with them and the flow of Christians returning to Western Europe brought with a special appreciation of Arab science. In this period, The Spanish Christians gradually took the care of Libya which they had lost to Islam in the first eight centuries. Thus, he and the whole of Christian Europe in general had developed a new concept in Spain that was a new idea of the magnificent Muslim Andalus civilization. Europeans learned that there were books of Arab-based deep scientific material sequentially translated into Greek-Aristotle's work, for example, their own production-Ibn Sena's work, among others. Despite the relative disinterest of reading the work of those who have been deadly and ungodly enemies, a movement emerged to translate them into That European scholars can use them . French Bhimmasa Gherbert (approx. 940-1003), in the future Pope Wild Pope II in 999, was one of the first students of this movement. English academic Robert de Chester first finished working in 1144, to translate the Arabic work of The Chemia into Latin. After many other, and the main translator was Italian caller Garurdu de Cremona (approx. 1114-87). He had a lot of time in his life in Toledo, which was taken by The Christian Forces in 1085. He has done 92 Arabic work, some of them are very unusual. Thus, about 1200, the European saw finds past and were able to try to move forward with them, will surely face a more dead and than the broad path of development. The first big European was The Risania Elberto de Bollastt (approx. 1200-80), better known as The Elberto Migno. He studied the extreme work of Aristotle, and that's it through that Aristotlean philosophy became very important for the late middle age and early modern academics. Elberto Maku described Zarnik honso clearly during his camia experiments he sometimes counted as a perkashi of this substance that, although, at least impurely, he was probably known for ancient alkamymastes. Albert was a contemporary great English monk Roger Bacon (1214-92), who is known to him for clearly expressed experience today that the application of experiments and science rather than techniques will hold important hope for progress. He was fine, but the world was not yet in a position to accept it. Bacon tried to write a universal encyclopedia of knowledge, and his writings have the first explanation of black ammo. He even caused to his perkashi, but no sure, that the original perkashi is unknown. At that time black gunpowder helped destroy the medieval order of society, which provided troops with a means to force a surrender to a castle, and the opportunity to shoot in the foot riders. It was the first sign of technology development that led European forces to conquer other continents over five centuries between 1400 and 1900, a winner that has changed its mark only in our day. In more than one sufi equivalent. The Works attributed to The K-mamaya Sapaniardas Arunaldo de Walanova (approx. 1235-1311) and Ramondo Lulio (1235-1315) are found in works, although it is not sure that they were real writers. These writings made the idea of transmoutaion is highly supported, and it is also assumed (by tradition) which made Lulio Gold for England's Mordch Edward II. But the most important name of medieval al-Khemists is not known, as he wrote under The Takbsgeber, the Arab-Russian who lived two centuries ago. Nothing is known about this liar Geber was probably Spanish besides him and he wrote around 1300. It was the first to describe the most important simple substance After him, vertican, and you get the easier laguo to start out. This is the most important acid, such as acetic and caner, came from organic world. The discovery of strong mineral acids was the most important advance since its hard-to-get iron about 3000 years ago. Europeans take many chemical reactions and dissolve multiple substances with the help of strong mineral acids, which greeks and Arabs cannot get with the cancer, in which strong acid available to them. In fact, mineral acids were much more important than well-sleeping humans, even if it was achieved by the transmoutaon. The price of gold will soon disappear as it will be closed to the disuse, while mineral acids are the most valuable and cheaper and more aperture. However, human nature is that mineral acid does not much of an impression, while gold continued its search. But after that, after the start of The Camea, the third time, the Greeks and then the Arabs started as early as it was. Gold hunting became at least a complete skill, although its great scholars (Boel and Newton) were not among them, because as early as the 17th century, their knowledge to resist the requirements. Once again, under the government of The Dutyline a thousand years ago, chemistry study was forbidden for fear of success in getting to sleep out of anger in haram. Pope John XXII announced his keep in 1317, and honest alchemists, forced to work secretly, got blacker than ever, while, as always, the dishonest chemical was secret. The new winds in Europe were becoming more and more violent. The remnants of the Byzantine empire were clearly out of the way with their quarrel government in Constantinia. In 1204, it was brutally returned to Western Europe due to the Crusade, and there were many great knowledge documents. Until then, at least in this city, we have lost forever. The Greeks re-achieved the city in 1261, but it was just a shadow of what had been done before, to the following two centuries, Turkish forces were continuously closed down in the city and finally 1453, Constantinia, which has been since Turkey, fell. Before and after the fall, greek scholars escaped from Western Europe, taking part of their libraries and surviving with them. The western world is only a legacy of the remnants of Greek knowledge, but they were still very much motivated. It was also the time of great investigation, in which the discovery of the Kumpass took part in the 18th century. I was discovered 1497 africa coast and was changed around the continent. Europe can trade directly with the Far East with the possibility of reaching India by sea and avoiding the Islamic world. Even more spectacular were Christopher Columbus' journey between 1492 and 1504, which was done in a way which was so soon revealed (though Columbus himself never admitted the fact) that a new part of the world was discovered. Europeans were discovering many facts to great Greek philosophers that they started to share the idea that, after all, the Greeks were not supermen. European scholars who had already shown their lead in some areas of science were beginning to be better in other cases. It destroyed a kind of psychological blockade, and it was easy to question the results of the ansans. Similarly, the age of research is designed by a German mover, Jon Gutenberg (approx. 1397-1468), the first practical printing press, using the war-going varieties that may be disassemenable and put together to print any required book. For the first time in history it was possible to produce numbers and books economically, without fear of errors in the copy (although, of course, there may be errors in structure). Thanks to the printing press, unsons popular concepts will not be erased due to the lack of taking on their backs to work the book's laborious. One of the first to appear in the print form was the poem Locquao, which spread the Atomstock concept across Europe. In 1543 2 revolutionary books were published that were nicely ignored by Orthodox thinkers in the pre-print era, but which have now spread everywhere and cannot be ignored. One of them was written by Polish Hagdavel, Nickolas Koppernicus (1473-1543), who maintained that earth was not the centre of the universe, as it was taken to the land of jaagya. Greek hagollods, but there was sun. The second book was written by a flamash jarah, Andreas Wessalwwas (1514 – 1564), who participated in human anatomy with unparalleled accuracy. This work was based on Vesalius's own observation and was dealt from ancient Greek sources that rejected many beliefs. Greek astronomy and biology have wasted this simultaneous (even if Greek concepts maintained their influence in some areas for a century or more) which was considered as the beginning of the scientific revolution. This revolution was only a little enter the world of the chemical, but is influenced by some capacity in both the mineral and medical aspects of the chemical. At the end of The Kimia, the new spirit was generated with the work of two contemporary doctors, one German, George Boyer (1494-1555), and another Swiss, Tuparastos Bombastos van Hoimm (1493-1591). The bavir is known as agricultural, which means a farmer in Latin (e.g. in 'Baviir' German). She became interested in minerals for possible drug connections. In fact, the connection between medicine and drugs and the clinical Maneralogast collection was a prominent feature in the development of chemistry over the next two and a half centuries. The book of Metallock Agricultural D (on metaling) (see picture. 3) was published in 1556, and it collects all practical knowledge that can be collected between mining of that time. This book, written in a clear manner and with the best reflection of mining machinery, became instantly popular and still remains a remarkable science classic today. De Metalllakey, the most important work on chemical technology before 1700, established minerals as science. (The most important book on metaling and chemistry that was earlier applicable to agriculture was of Monk Tuga, possibly Greek, who lived around 1000). As for Von Hohenheim, he is famous by his self-imposed Paracelsus, which means better than The Callusus. Callusus was a Roman who wrote about medicine and whose work was recently hidden . In the case of both paracelsos, maximum was targeted and, false idolatomy. Chitra 3. The book de re-ly Metallacci by AmricolaParacelsso, represented a change from the centre of interest for the kimia, gold, medicine, by Ibn Sina five centuries ago. Paracelsos maintained the end of the last-case of the khema was the discovery of the transmotaone technique, but the preparation of medications that treat diseases. The most frequent plant preparations used for these purposes in ancient age were, but Paracelsos was convinced of the effectiveness of minerals as drugs. paracelsos Despite his insistence against transmotaan, an old school alchemist. He accepted the Greeks and five elements of three principles (murkri, salfer and salt). He was spoken of as the main rebel of his time and even went so far as to have burned. In addition, at that time, with more foundation, this zinc metal is received and is often considered to be a perkashi. In addition to this, the fact that zinc, with the tanba or in the form of adulteration (brass), was known since ancient times. Paracelsos was a controversial figure for half a century after his death. His followers added to the spit of chemical industry and its discovery, and in some cases reduced them to meaningless surtaliqaos. This corruption was added by the losses of a time when The Kanya was quickly pointed to the explanation and stage of the naqqa. For example, German-Raised Andreas Labao (approx. 1540 – 1616), written by Minnam Labayvos, published a camia in 1597. This book was a summary of medieval achievements in The Chemistry, and the first known name can be considered as chemistry text, because it was clearly written and without suflism. In fact, he accelerated the black theories of parakaalsans, although he agreed with Paraclos that the main function of chemistry is to use medicine. Labayvos was the first to explain the preparation of haderochalorak acid, tan teteraclynoid and ammon salafist. He also described the preparation of royal water, a mixture of nitrick and haderochlawrak acid called the ability to dissolve gold. He also suggested that mineral matter evaporate their solution when the form of crystals produced can be recognized. However, he believed that transmotaan was possible, and the discovery of ways to make gold was an important purpose of studying chemistry. In 1604, a German named Johannes Tholde published a more special text (something and its author is not known). He attributed the book to a German monk, Basal, but it's almost sure it's a name but a. Volume is entitled to the serna's tremful float, the metal and its diverts are well-used with the medical use of the transaction. Later, a German camia, Jon Rudlof-Gluber (1604-68), discovered a method for the preparation of haderochalorak acid by the process of the gandh acid sand salt on common salt. In this process he got a solvent, sudeme salafist, which is currently called glyuber salt. Glyuber became familiar with the substance, studied intensely and warned of its rinichuck activity. He's a fantastic salt and it's considered a Almost of the water life. Glouber dedicated itself to the production of this compound, as well as others he considered the value of the medicines and whatever a living as a way of making it great. While this possession was less spectacular than gold preparation, it proved more useful and profitable. Economic reality also made a strong talk for those who were still wasting time on an infinite race behind profitable men. In fact, during the seventeenth century, The Chemistry Frank went into decline, and in the eighteenth century it was the search for transmotaon that could be called only scientific chemistry. Chapter 3 Transfer Metal 1. Measure 2. Law Boyl 3. New concept of elements 4. Philogistit. Yet the measurements, and despite its development, were delayed compared to other branches of chemical knowledge. The importance of quantitative mechanics and the application of mathematical techniques for astronomy was recognized from an ancient time. One reason why the ansans occupied is that the astronomical problems were relatively easy, and some of them might also have dealt very well with flat friendships. Italian scientist Galileo Galileo (1564-1642), who over the years studied the behavior of bodies during his fall 1590-99, Brey worked as a physics man in his application for mathematical and careful measurement. The results of its work, almost a century later, for the important results of English science Ishaq Newton (1642-1727). In his work, The Priyanka Mathemtika, published in 1687, Newton introduced three of his laws, which worked on the basis for the science of macreaser for more than two centuries. In the same book Newton, the theory of gravity, which explains for two centuries a proper explanation for the movement of sons and which can reach us within our personal observations and speed, remains true today. This principle is used in the case of Newton, which is developing a powerful new branch which has adopted itself. With Newton, the scientific revolution reached its peak. There were no more outstanding problems of greeks or generally getting away. They had western Europe and will never be seen again . But it was not recorded in a century after his decisive work in chemistry to explain the carefully non-standard measures just in the gatamy detail. In fact, Newton, while building the structure And the world of science is trying recipes to make gold by transmoitaon in the best, drowning in the physical, the camera with a beauty and a lookthat is a scarcity. In error it cannot blame the constant chemicals completely. If they were taken to share and measure, it was not more difficult to present it because the material sofa they had worked in from that was easy enough to deal with mathematical treatment. However, chemistry has progressed, and already there are many signs of a future chemical revolution in the Gheliu era. Such indications are generated, for example, in the work of The Flamash Dr. Jean Buptily van Helmont (1577-1644). He cultivated a tree on a certain amount of soil, periodically added water and carefully raised it as a grounding. From that moment I hoped to discover the origin of living birds set up by the tree, I was applying measurements of chemistry and biological problems. By the time of Van Hemont, the only known and studied air was the air itself, which seemed to be quite different from other substances to serve as a factor for the Greeks. In fact, al-Qaemists had often and had wanpas in their experiments, but most of them were easy to read and observe and ignore. These evaporation mystery was easily called Vapuryed actually the case: the spart, actually a word that means either of or air, but which also had a clear sense of mysterious and even alok something. We are still talking about certain spartite carbohydrates or sprates for tura. Wine is known by far the oldest and best liquid. So much so that the word spart in English is over, especially for the alcohol spart. Van Hemont was the first to consider and study the vanpons he produced himself. He observed that he was like his physical appearance, but not in all his characteristics. In particular, he got the vanps from the wood when burning, which looked like the wind, but did not behave as such. For Van Helmonte, especially the matter like volume or shape without it's air, greek chaos was anything like: the real case, report and disorder, from which the universe was created (according to the Greek goddess). Van Hemont vanpon name is applicable to chaos, which becomes gas declared with flamash phonetics. This term still apply to substances like air. Wayne Helmont called gas to get from wild gas. It was We currently make carbon di-allied calls. The study of the gasses, the easiest form of the case, was the first to give itself credit to precise measurement techniques: it worked as a way to the world of modern chemistry. 2. Van Helmonte's laws of the oil toward the end of life, the gasses specifically happened, as the most common gas reached a decisive new significance. Italian physicist Sonanglast toprove Torreco (1608-47), in 1643, that air pressure used. He showed that the Air-Makara could hold a column of height 70 cm and thus invent the barometer. The gasses suddenly lost their mystery. They were materials, weight loss, such as liquids and more easily studied. They differed with them especially in their very low density. The pressure used by the weight of the environment was demonstrated by the bad German physics Oto van Guereike (1602-86). He invented an air pump with which a vessel could be removed, so that the air pressure did not match the pressure of the indoor air outside. In 1654, Guerike developed two metal simaskapahs that fit through a gareasad rim. After two semespahoras joined and the air was dissuased, they were present by the pump, external air pressure held semespahahas with each other. Horse yontus is possibly thrown in opposite directions attached to each of the two semespahoras and fostagatids, the semespahahas failed to separate. However, as soon as the air semespharas were allowed to re-penetrate, they were able to separate them. Chitra 4. The law of the boiler, in which the relationship between a gas pressure and volume at constant temperature is established, is done from true experience. This tube was put into the long branch and it pushed the air attached to the short branch. By turning the height of the Murree column, the air column is reduced by half. The relationship is described in the top-of-the-list work, which is a section of an exaggeration branch. These kinds of protests have created a lot of interest in the air properties. And he was particularly born in the vein of Irish chemist Robert Boel (1627-91), who developed a more perfect air pump than Guerica. Instead, to speak, he tried the procedure to extenuate air from a container by breathing, as he shaved. Robert Bueledami Marauthan discovered his experiments, the boyel, found that the volume of an air sample differed with pressure according to a simple reverse ratio (see figure 4), and was discovered by leaving a very long, specially built tube, and leaving an air sample in the short, closed end, which was adjustable by a patch. In the long term more the murkri, the open end can increase the attached air pressure. If you include enough murree on the subject of air for double pressure (double-carry weight), the connected air volume was reduced by half. If the pressure increases three times, the volume has reduced by a third. On the other hand, if the pressure was reduced, the wind would expand. The volume that increased in this relationship was first published in 1622, and we still refer to it as the law of the boy. This was the first attempt to apply accurate measurements for chemicals, especially for changes in a substance of interest [6]. The boyel did not determine whether the temperature should be kept constant to correct the law. He probably did it like this, and he assumed it would take it before. France Physics Edme Marautty (1630 – 1684), independently discovered the law of the boyle stoking around 1680, that temperature should remain constant. Therefore, the law of the boel in the continent of Europe is often called the Law of Maravatty. The experience of the boyel presented a centre of passion for the growing number of atomystis. As has been said earlier, The Poem of Lucretio, published in a print edition, had died the european humanist's attention in Greek opinion on Atomesem. Pierre Gassanda (1592 – 1655), a French philosopher, became a convincing atomaist as a result; And his writings were so affected by the boy ' s writings that as a result , the boilers also changed into atomesam . As the focus on liquid continues and alone is atomesium, there was no more in time of the boiler than in The Magnet. Liquids and allergies can only be depressed in equal proportion. If they contain atoms, then this atom must be in touch, and it cannot be kept close to it. Therefore, it is difficult to argue that liquids and allergies can be nuclearally formed, because if they are constantly made of matter, it will also be difficult to do them to do a computer. Why then worry about atom? However, the air, as was already observed in ancient times and the boiler was now made clear bad, can be easily computerised. How can it be, unless it was separated by the space from the small nuclear? Air compression will only mean, from this point of view, the free space to keep nuclear in close contact. If this opinion on the gasis is accepted, it is easy to believe that liquids and allergies also contain atom. For example, water powder. Could it happen, until it disappears into the form of small particles? And what would be easier, then, besides that it goes through the atom in atom steam? If the water is hot, it is obvious, and steam is established. Water vanp is the physical characteristics of a substance like air and is natural to assume that it contains atom. But if water contains nuclear in its gas form, why not in its liquid form, as well as in the solid form of ice? And if it is true of water, why not all ? Such arguments were impressive, and for the first time since the atom was conceived, 2000 years ago, Attomasam started to gain multiple followers. For example, Newton. However, atom was a sedime concept. Nothing can be said about them, except that if their existence was accepted, it was easy to explain the behavior of the gasses. It took another century and a half before Atomeasam to approach the map well. New concept suo-ointing of elements mark the end of the terms of the study of the book, the alchemist and the alchemist. Boel defeated the term Sellrum [7] in his book, which was published in 1661. Since then, science has been chemistry, and the chemists were working in that field. The boyel was defeated because he was derived from the initial principles that the old results were not ready to be unvisible. The boyel was particularly angry with ancient attempts to identify elements of the universe through reasoning. Instead, he explained the elements in a real, practical way. One element, always considered since the time of the stories, was one of the basic simple substances in which the universe was formed. But now any deemed element will be checked to see that it was really easy. If a substance can break into simple matter, it was not a factor, but the easiest substance could be, until the chemists learned to break them into even easier substances. In addition, there were two elements that could be joined with each other for the formation of a third substance, called a compound, and in this case the compound should be able to break into two original elements. The term 'element', in this context, is just a practical meaning. A substance such as quartz, for example, can be considered an element until the experimenting chemistry discovered a way to convert it into two or as simple a substance as it can be. In fact, according to this concept, no substance There is never any element, because in an interim sense, as the currentization was not, as the knowledge developed, it was not possible to format a procedure to break a alleged element into two simple substances. Until the 20th century, the nature of the elements cannot be described in a non-temporary way. Just because the boyel demanded an experiable approach when explaining the elements (a view adopted later), he knew what different elements were that doesn't mean. After all, it was done, the experimenting view showed that the Greek elements, fire, air, water and earth, were elements. The boyl was persuaded, for example, about the accuracy of the risanya point that the metals were not elements, and that a metal could become one another. In 1689 he asked the British government to abolish the law against the preparation of gold alchemists (they too fear the destruction of the economy) because they believed that gold was being formed from a basic metal, chemistry could help demonstrate the atomic principle of the issue. But the boywas wrong about it; Metal elements were proved. Of course, the nine substances that we now recognise elements were known for the ansants: seven metals (gold, silver, tanba, iron, tan, lide and mercury) and two non-metals (carbon and salfer). In addition, there were now four substances which were recognized as elements, which had become familiar with medieval alkymastes: zarnekh, serma, flower and zinc. The boyel himself was about to be a new element of perkashi. In 1680 he prepared the force of the piss. However, about five or ten years ago, the fact that a German camefrom came from a brand of more than one brand (about 1692). Thomas has many and his friend machine of the mantra. The brand is sometimes called the last of alkymists, and its discovery really took place when he was looking for the stone of the philosopher, who thought he would find all the places in his own piss. The brand was the first to discover an element that, in any case, before the development of modern science, in any form. The seventeenth century discovered about the flogast is the stress and unusual trend that can be given important results to the production of a vacuum and the air pressure act. It happens to many people that space can occur without using air pumps. Assume the water is steamed and a chamber is full of steam, then cool the chamber with a cool water. Steam inside the chamber will be attached to water droplet, and will instead form a gap. If one of the walls of the chamber was mobile, the air pressure outside would be pushed out. Wall camera bowels. The warwall can be pushed back out, more steam configuration and allow it in the chamber; And if, once again, after steam the inner can move back. If we assume that the battlewall is part of a piston, then we will feel that the piston will move out and out, and this swaying can be used, for example, to run the pump. The result was that, for the first time, humanity would no longer have to rely on its own muscles or the power of animals. Never should it be air-conducive or at the cost of their against-power, nor of water located in some points of energy. Chitra 5. Newcoman pumping machine, which run on pressure in the environment. Water cylinder spareed inside the koondasas steam, creating a gap. Pistons return edited Ford to the top of the steam by injecting a new steam, descending into his pass. Instead it had an energy source that it could use anywhere from boiling water on any wood or charcoal fire at any time. It was a decisive factor which is unconvectous to the beginning of the industrial revolution. The growing interest arising from 1650 on the possibility of finding new applications from chemistry and, through the steam engine, was forced to perform the hard work of the earth, led to new awareness of the fire. Why burn some things and there are no things? What is the nature of the dahan? According to ancient Greek concepts, what can burn itself is included in the element of fire, which is released under appropriate conditions. The alchemical concepts were similar, except that fuel was something that contained the rule of the 'sulfer' (not necessarily the real sulfer). In 1669, a German-named Kenya, Jon Joashm Beher (1635-82), tried to further raitonai, introducing a new name. He thought that it consisted of three types of solid land. One of them called her Tiera Pangos (the nupt earth) and felt as the giving principle. George Ernest Stahl (1660-1734) was the follower of the Bachelor's rather inimitable beliefs, german-chemical and physics George Ernest Stahl (1660-1734). He also suggested a new name for the give principle, to burn it to the meaning of the word the holocaust greek word. Then he developed a scheme based on the flogast which could explain the dahan . The stills maintained burning garbage items were rich in the flogast, and the dahan process meant damage to the air-in-flogast. What was left after the floglast and so on Keep burning. So, the wood was the flogust, but the rock was not. Also, Stohl said that the mingling of metals was consistent with wood recuse, and claimed that metals had added to the flogust, but when they were found (or calcinated). The idea was important, because of this allowed the metal to suggest a reasonable explanation about mineral conversions, the first great chemical discovery of the civilized man. The explanation was: A mineral flowset, I'm poor, hot with charcoal, very rich in the flowpast. The flowcost goes through carbon, i.e. the fulgost-rich charcoal is converted into poor eras in the fulocost, while the exact opposite is with minerals. Sathal understood that the wind was only indirectly useful in dahan. He only serve as a transporter, occupying the flogast as it left wood or metal and moved to someone (if available). Sathal's theory found opposition in the blogus, especially that herman Boerhaave (1668-1738), a Dutch physics, which argued that normal resin and mingling could not be different versions of the same trend. It is clear that in one case the flame is there and the other is not. But the explanation for Sathal was that in the recuse of matter such as wood, the flogast is heated around it and is released immediately that looks in the form of a flame. In Mingling, the damage to the flogust is slow, and no flame appears. Despite Boerhaave's opposition, The Blogist Theory gained popularity throughout the 18 th century. In the 1970s it was almost universally accepted by chemistry, since then it seemed to explain a lot of things and clearly. But stohl nor his followers were able to explain that one was difficult. The more burning garbage material, such as wood, paper and grease, was mostly used on burning. The remaining dod or rahe was lighter than the original substance, which was expected, because the flogast had abandoned the original substance. However, when metals were hostile, according to Sathal's theory, they lost the flogast, but the mopad metal was more serious than the original (a fact that al-Khemists had already been celebrated in 1490). Can the flogust be negative weight, so that when some eighteenth century chemicals are maintained, a substance can go ahead? In that case, why did wood burn it when why was the weight lost? Were there two types of flogast, one with a positive weight and a negative weight? This unsolved problem was not very serious in the century As we think today. As addicts we are to accurately measure phenomena, any unknown change in weight will give us to think. But the 18th century chemists had not yet accepted the importance of careful measurement and were not concerned about such changes. Until the flogist theory explained changes in appearance and features, different conditions in weight could be ignored, he thought. Chapter 4 Gasiseconthanent: 1. Carbon Dioxygen and Nitrogen 2. Hydrogen and Oxygen 3. Measure wins 4. Combustion1. During carbon di-ayside and nitrogen recin, convincing weight change has been found to be explained, of course, which appeared or disappeared while the compounds were formed. Despite the gradual development of gas knowledge since the time of Van Hemont, he had yet to attempt to repair their existence, besides taking into account the stohl's time a century ago. Thinking about weight change during the recin, the researchers were only eyes for solids and liquids. The ass espouts were light from wood, but what happened to the vanpaas issued by the fire case? He didn't consider himself. The morcha was heavier than metal, but did he take the air out of the air? It was not considered. Their deficiency can be addressed before, chemicals need to become more familiar with the gasses. We had to catch, close and read a substance very hard to overcome the fear. English chemistry Stephen Hees (1667 – 1761) took a step in the right direction, in the early 18th century, by collecting gas on water. The vanpas were formed as a result of a chemical reaction, by a tube, in a container that was full of water and faced down in a jofina with water. Gas sized container, water is forced by waste and open down. Finally, Hezi got a container of gas or gas set up in response. Halan did not make himself the difference between different gasses, nor did he study their characteristics, but the fact that he had expressed a simple technique to sustain them. Scott Chemistry Joseph Blake (1728-99) took another important step forward. This thesis was about a chemical issue that received a medical degree in 1754 (it was when medicine and minerals were nearby tensors), and published its results in 1756. What happened to it was the stone of the rock heated (calcium carbonate). It broke down the carbonnet, released a gas and left the back of it the width (calcium-acid). Gas release can be re-found with calcium acid Farm calcium carbonite again. Gas (carbon di-axide) was the same with Van Helmont's 'Wild Gas', but Black called it 'fixed', because it was part of a solid substance that thus ('fixed'). Black results were important for many reasons. First, it appeared that carbon di-axed could be set by a mineral heat, along with the burning wood; thus a significant connection was established between worlds of dynamic and lifeless. Second, it appears that gas substances are not only released by allergies and liquids, but can be done in hand with them to produce chemical changes. This discovery took a lot out of their mystery by the gasses and presented them as a different type of cases which are common lying (less chemically) with the most commonly known allergies and liquids. On the other hand, the black that appears when calcium is abandoned in the abyss, it gradually returned to calcium carbonite. From this they are small amounts of carbon dioxygen in the derived (right) environment. The first clear indication here is that the air is not a simple substance and that, for this reason, despite the Greek concept, it is not an element according to the definition of the boiler. It is a mixture of at least two different substances, common air and carbon di-allied. Study the effects of heat on calcium carbonite, the weight loss of black. They also ma'ama the amount of calcium carbonite neutlalaid acid. It was a major step towards applying quantitative measurements in chemical changes, an analysis method to reach full maturity with the lawasier soon. Studying the properties of carbon di-ayadice, Black observed that the wax ingt can't burn in his lap. A wax light ends up under the lighted closing in a closed container filled with normal air, and the rest of the air cannot put a flame again. This discovery certainly seems appropriate, because the bright light has established carbon di-allied. But when the carbon diaeafrom the attached air is absorbed by the diae-exide chemical compounds, some unabsorber remains air. It remains, which does not contain carbon di-axed, either can't catch a flame. Black approved this issue on one of his disciples, Scottish chemist Daniel Rutherford (1749 – 1819). He died until Rutherford put a mouse in a closed volume of air. Then he lit up the wax ingin the gas, until he went out. And he lit the force into it until the match was burnt . The air then passed through a substance capable of absorbing carbon di-axide. Failed to maintain remaining air A mouse could not live on it and the wax placed in his sine went out. Rutherford reported this experience in 1772. Since he and black were convinced of the mobility of the flogast theory, they tried to explain their findings in terms of the principle: mouse breathing and burning of wax and waxing and force, the flogast was released and added to the air along with carbon di-axide. Later by carbon diacid, the rest of the air still has a lot of flogast, so that it was toured with more. Could not accept any more. Theobjects did not burn in it for this reason. For this reasoning, Rutherford was isolated that called gas phlogisized. Today we call it nitrogen, and we give Rutherford credit for his discovery. Hydrogen and oxygen are two other English chemists, followers of the flogast theory, currently high-ranking in the study of the surrounding gasses. One of them was Henry Pand (1731-1810). He was a rich serious who used to research in different fields, but he kept himto his work results and rarely published them. Fortunately, he published the results of his experiments on gas. The panded sat was particularly interested in a gas when acid responded with some metals. This gas was first isolated by the boilers and hees, and perhaps by others, but the panded, in 1766, was first to conduct a systematic investigation of its properties. That's why he usually gathers with his discovery. This gas was later called hydrogen. The panded was the first to measure the weight of the specific skins of different gasses, i.e. determining the density of each gas. He realized that hydrogen is unusual light, only the fourteenth density in the air (and today it remains the lowest of known gas). It was another strange property: unlike carbon di-exide and the same air, it was easily jollanshell. The panded, considering their extreme slowness and giving, specuated with the possibility they had the same isolated phlogast. The second chemistry was Joseph Pressley (1733-1804), a unionminister who was extremely interested, outside the association, in chemistry. Towards the end of 1760 he captured a parsh in The Leyds, England, with which, manchester, was a brevry. The yeast of grain produces carbon diae-exide, which Pressley can get in abundance for such experiments. Collecting carbon dioxide on water, he said dissolving a portion and gave the water a pleasant lying taste. It was we now called seltz or soda water. And because you just need to add gem and sugar Production f. sodas, Pressley can be considered as the father of the modern soft drinks industry. Pressley started studying other gasses in the early 1770s-79s. At that time only three different gasses were known: Air itself, Van Hemont and Black Carbon Dioxide, and Branded Hydrogen. Rutherford will add nitrogen as a fourth gas. Pressley, for his part, departed to study isolated and some other gasses. His experience with carbon di-axed had taught him that the gas water could be water-water-respherized and after his experiments did not miss them, he tried to collect them on the murree. By this method they were able to collect and study the natrvos axide, ammonia, hydrogen cloud and salfer diacid (to give them their current names), all of which are too spindle in water to resist passing through. In 1774, the use of the murree in its work with the gas led to The Most Important Discovery of Pressley. When the murree, heated in the air, forms a brick red calcinated (now called the murree-acid). Pressley put some of this callican in a test tube and heated it with a lens that focuses on the sun rays. Calcining was converted back to The Murree, which appeared as shiny balls on the top of the test tube. Also, analysis released a gas of very strange features. Fuel burned earlier and brighter in this gas than in the air. A wooden snout was put into a container in which the gas was burning from the fire. Pressley tried to explain the trend by resorting to the flogist theory. Since the objects burned so easily in this gas, they had to be able to release the flogist with extraordinary ease. How could it be, until the gas was an air sample from which the flogust was extracted, so that it accepted a new partnership with special greed? That way, Pressley said to this new gas' (However, a few years later it was called Oxygen, its name still remains.) In fact, The Dephlogstockof Pressley seemed to be opposite to The Wind Rutherford was phashasped. A mouse died in the latter, but first I was especially active and selectable. Pressley tried to breathe some of it, and felt light and comfortable. But both Rutherford and Pressley were first by a Sweden chemist, Carl Wilhelm Siqhly (1742 – 1786), a chemist who brought Sweden to Sweden by the front of the 18th century. One of them, George Brand (1694-1730), studied around 1730 a water mineral that looked like a cane, but which, for mining frustration, did not give to the tanba when presenting Routine treatment. The Miners thought it was the mineral pretudation by the spirits of the earth, which he called kobolds. The brand is successful in establishing that it has no tanaba, but a new metal (which looked like iron for its chemical properties) called the cobalt in honor of the spirits of the earth. In 1751, Samylon Friedrich Krunstedt (1722 – 65) discovered a very similar metal, out; June Magarten G(1745-1818) 1774 in Manganage, and Peter Jacob Haslm (1746-1813) extract Maolbadanam in 1782. Discover these new elements of The Swedes they demonstrated the advanced minerals practiced in this nation. For example, Kronstadt introduced Bluetooth to the study of the khanj (see figure 6). It consists of a long tube that collects towards an end and which, thrown wide, created a jet of air at the end of its indentation. This jet, directed towards the flames, increased its heat. Chitra 6. The torch, introduced in the laboratory by The Dutch Chemistry Constedt (1722 – 1765), was an important tool of analysis for more than a century, and is still used. The air is blown by the tube and the heat of the flames is monitored. Hot flame, acting on minerals, radiation is allowed to learn about the nature and structure of minerals from the color of flame, the type of vapour is formed, which has the acid of metal matter, etc. Bluetooth has been an important tool for working on chemical analysis for a century. The new technique— as so knowledgeable about the torch— is that Kronstedt suggested that they should not only be classified according to their appearance, but also according to their chemical structure. In 1758, details of this new form of book ranking were published. This work was another Pass by this of The Dutch Maneralogast Torbn Olof (1735 – 84). A rule to explain the barman has developed how one female responds with another, but not with a third. This means the existence of relationships (i.e. attractions) between females to get different degrees. They carefully prepared tables where various non-multiple relationships were recorded. These boards were very popular in their lives and for decades after that. The scychhely, which started out as an apothecary support, dwelled the attention of The Barman, who adopted it and sponsored it by. Saqheli discovered several acids including several acids, citeric acids, benzoic acids, malic acids, oglylock acids and galalock acids in the plant empire. Latic acid and york acid in animals, and molabadak acid and arsanous acid in minerals. They produced three highly toxic gases and probed: Fluoide Hydrogen with sulphed and hydrogen. (Worked with their early death should be the result of slow venkataof compounds, and they usually tried.) Scoheli took part in the discovery of many of the elements attributed to his Swedhcolleagues. But most importantly, he developed oxygen and nitrogen in 1771 and 1772. They produced oxygen from a particular substance from which it was easily separated by heat and several years later added the used murree-acid by Pressley. Scycheli carefully described his experiences, but by the negligence of his publisher, explained that not until 1777 that appeared in the press. The work of Rutherford and Pressley was then revealed, which was discovered to fame. 3 The victory of this initiative had to bring together several important discoveries in the gas sector in the world view which took place in the late eighteenth century. His author was on stage. He was french chemist Beclère Laeron Lawasier (1743 – 94). From the beginning of their chemical research, Lawasier recognized the importance of accurate measurement. Thus, his first important task, in 1764, is about investigating the structure of the plastic: he heats up to extract the water involved, and then the amount of water released is being quantified. He is, like black and spread, applying chemical changes to measurements which include those. However, Lawasier was more organized, and is used as a device with it to bring down ancient theories, which is already inuse, can only prevent the growth of chemistry. Beclère Laaron de Lawasser and Mrs. Allyvía, for example, still retained in the old Greek concept of elements in the 1770 clong, and maintained that the transmoitaon was possible, because the water was converted from heat to earth for a long time. This assumption seemed appropriate (even, initially, for Lawasier), a glass container set up a solid tank in heating water for several days. Lawasier decided to check this so-called transmotaone with more than just an eye examination. For 101 days he watered steam in an apprate and returned it to the flask, so that no substance was lost during the experiment. And of course, he could not forget the measurements. He made the water and container long boiling period before and after the seed. The shake appeared, but the water did not change weight while boiling. So the jlotka could not be made of water . However, the vessel was once disbelieved that it was lost weight, a loss that was only its weight In other words, the shake was not changed on the ground, but the glass material was attacked by hot water and pre-heated in solid pieces. Here is a clear example in which measurement can lead to a reasonable reality demonstration, while eye testimony is simply due to a false result. Lawasier became interested in Dahan, first of all, because it was a huge problem of 18th century chemistry, and second, because one of his first achievements was a trial on improving road lighting techniques in 1760-69. It began in 1772, when it joined other chemists that warmup in a closed container until it disappears. The formation of carbon dioxide was the first clear demonstration that diamond was a form of carbon and therefore related to coal closely, without anything more. Heat metals such as lead into containers closed with a limited amount of tons and air. Both metals prepared a certain point of a calcinated surface until it was more advanced. Supporters of the flogast theory say the air was absorbed by the metal the flogast he could catch. But, as was well known, calcining metal itself was more than, and yet when lawasier's entire container (metal, calcining, air, etc.) after heat, they weigh only the same as before their heat. The result was the exclusion that if the metal had partially gain weight by calcining, the container lost an equal amount of weight. That something, it seems, may have happened, and in that case there should be a partial gap in the container. Verily , when Lawasier opened the flasc , the wind reached it , after which he found that flasc and his contents had gain weight . The lawasier shows in such a way that the callicanation of a metal was not the result of the loss of the mysterious flogast, but the advantage of too much material: a part of the air. Now he was able to explain the formation of metals from their minerals; It was a combination of metal and gas. When heated with carbon, it has taken gas from metal, behind carbon diacid configuration and metal drop. Thus, while Stohl said that such a plant was a metal-getting process to make it more than carbon, Lawasier said the process was involved in the coal-gas route. But these two explanations, though, have not explained the same fact ? Was there no reason to prefer the explanation of Stohl's lawasier? Yeah, there was, because The theory of gas transfer of the lawasier may explain the change in weight during the recin. The callicanation was heavier than metal, resulting in weight of it being added to the air part. Wood was also burning with the addition of air to its substance, but saw no weight because the newly formed substance (carbon di-axide) was a federated gas turn in the atmosphere. The remaining fans were lighter than the original wood. If the wood was burned in an attached space, the gasses set up in the process will remain inside the system, and then it can be shown that the rahe, plus evaporation was established, besides the air was left, the actual weight of the air other than wood will be maintained. Lawasier warned that if all substances are participating in chemical responses and all the configured products were taken to the account during experiments, weight will never change (or, using the most precise term of physics, massive change). For this reason, Lawasier maintained that mass was not born or destroyed, but was changed from one substance to another. It is the law of mass protection, which has worked as a foundation for the chemistry of the nineteenth century [8]. The results of the lawasier were such intense lying by use, as can be seen, that the chemicals have accepted the use of this method that at this time of time. 4 However, Lawasier Dahan was not completely satisfied. The air was combined with metals to form a calcining and wood to form the gasses, but all the air was not shared in this way, but only a fifth did. Why did it happen? Lawasier of Pressley, Perkashi, visited Paris in 1774, and described the results to it. Lawasier immediately understood its meaning, and I published their views in 1775. Air is not a simple substance, it suggested, but a mixture of two gasses in the ratio 1 to 4. The fifth part of the air was The Wireless Air of Pressley (although Lawasier, unfortunately, forgot to give The Pressley's due credit). It was this part of the air, and only this one, which was mixed with material in the dahan or in the process of mingling; which was essential for life which was transferred from more than one coal. It was Lawasier who got his name, oxygen, words from the mean acid producer, because Lawasier thought oxygen was an essential mixture of all acids. In this, as it was later revealed, I was wrong. The remaining four holocausts of air that could not sustain the dahan or Rutherford's flogstockati air was also a different gas. Lawasier Awa (meaning from the Greek word said unknowingly, but later changed the term with nitrogen. This word means a noise form, as nitrogen was found to be part of the mineral substance. Lawasier believed that this life was maintained by some kind of a dog-like process [9], because what we affect was oxygen rich and Carbon is low in dioxygen, while one we have inhaled is oxygen-finished and rich in carbon di-exide. He and his assistant, Pierre Simon de Lath (1749-1827) who later tried a famous hegolad to measure the oxygen released by Lee and animals. The results were somewhat disorderly, as breath oxygen did not appear in carbon di-ayexide. In 1783 The Pand was still working with its own jollinshell gas. He burned a sample of it and studied its results, checked that the evaporation was prepared from burning, was attached to liquid making, when investigated, was nothing and nothing less than water. This experience was of vital importance. First, it was another severe blow to the Greek principle elements, because it appeared that water was not a simple substance, but a combination of two gas products. Lawasier, aware of the experience, was burning in the combination with the branded hydrogen gas (water producer) and the source that hydrogen oxygen, and therefore water was a combination of hydrogen and oxygen. He also understood that food and living substances added a combination of carbon and hydrogen, so that when the air was inhaled, oxygen was used not only to make carbon diacid from carbon but also from hydrogen. This explanation explained the fact that this part of oxygen could not be measured in their initial experiments on breathing [10]. The new ideas of Lawasier were a complete blend of chemistry. All the mysterious principles had to fall with it. In the future only materials that can be weighted or scaled will be of interest to chemicals. After establishing this foundation, Lawasier began to raise the super structure. During the 1780s-89s, in collaboration with three other French chemists, Louis Bernard Gueton de Morriston (1737-1816), Kald Louis Bertrolet 1748-1822) and Beclère Frankuis de Foorcarvei (1755-1808), developed a logical name system that was published in 1787. Chemistry will never be a rago named in the days of chemistry when every smuggler has his own And others confused. Chitra 7. Lawasier's experiences were true with drawings by Mme in his chemistry elements. Lavoisier.Se will have a recognized system that everyone can use; A system is based on logical principles so that someone can guess the elements from which a compound has been set up in its name. For example, calcium was made of oxygen and calcium. Sodium cloud, sodium and clauren; hydrogen sulphed, sulfer and hydrogen. Etc. A careful system of prefixes and suffixes was also established to provide some indication of the proportions in which various elements existed. Thus, carbon di-aiuside contains more oxygen than carbon monoacid. On the other hand, Potasshim Chalorati was more oxygen than Chalorati, while the prolety was more than chalorati, and The Cloud was no oxygen. In 1789, Lawasier published a book (Early Contract Chemistry) that provided the world with its new theories and a united vision of chemical knowledge based on the samy tasmia. This was the first modern chemistry text. Among other things, the book included a list of all the elements up to that time (or, rather, all substances which are considered to be lawoseers according to the decision of the boiler, and they could not reduce the simpleones) (see figure 8). It is a credit to Lawasier that the 33-female list was just two completely incorrect. Both were light and caloric, as was evident in the decades after Lawasier, were not substances, but energy forms. Some of the remaining 31 were true elements according to the current requirements. These include substances such as gold and taanba- which have been famous since ancient times, as well as others, such as oxygen and maulbadanam, which were discovered a few years before the publication of the book of Lawassier. Eight of the listed substances (for example) were not accepted as elements, as they were already broken into the easy substance as soon as the lawasier. But, in any case, one of these simple substances became a new element. The new ideas of Lawasier (which have been there on this day) were opposed, especially from some of the pro-filogists, among them, Pressley. But others accepted the new chemistry. Barman, in Sweden, was one of them. In Germany, Chemist Martin Heinrich Klaproth (1743-1817) was one of the first converts. The approval of The Ories of Lawasier was important because there was some tendency because of the German stoihle. German to act on the flogast as a patriotic symbol. (Klaproth rose to fame after finding some elements: Uranium and Jaronia, in 1789.) Chitra 8. The list of elements collected by Lawasier, in these elements of the Khimastarithi this year, shows that the book of Lawassier was published, the Travma-phad French Revolution, the rapid rise in terror terror abuses. Lawasier, unfortunately, was concerned with an organization of tax collectors that revolutionaries considered a tool of corruption of the monarchy of hatred. All these officers were organized to be hanged in Glytine. One of them was Lawasier. Thus, in 1794, one of the biggest chemicals that ever existed, he was unnecessary and the best killing in his life. It was a moment to close this head, and maybe a century is not enough to create another like this, said Joseph Lagringe, distinguished mathematical press. Lawasier is nowadays remembered as the father of modern chemistry. Chitra 8 a and b Chapter 5 Attousthananant: 1. Law of The Prosaition 2. Dalton's theory 3. Aogodrav Phadyamana 4. Weight and symptoms 5. Electrolysis1. The successes of the Law of The Law of The Prosandit encouraged chemistry and to find other areas where accurate measurements can illuminate chemical response reading. Acids were one of these areas. Acid constitutes a natural group that contains a certain number of properties. They are chemically active, thus reacting with metals like zinc, tin or iron, dissolving them and production of hydrogen. They taste a wet (if thin or low enough to test them with imponati), due to the stain and change color in a certain way, etc. Unlike acids, each other has a group of substances called the adds. (Strong-based ad is called alkalais.) They are also chemical-enabled, bitter in taste, encouraged by acids to change the head of color in the opposite way, etc. Specifically, acid solutions can uninfluence base solutions. In other words, if acids and add-ons are mixed in easy proportions, the compound displays features that neither acid nor base. The mixture will be a salt solution, which is usually an acid or a light mixture of more than twenty. Thus, if hydrochloorak acid, strong and kastoc solution, sodium is mixed with hydroacid, strong alkali and easy amount of castak, it will be converted into sodium chlored, common cooking salt solution. German chemist Ermia hrecter (1762-1807) changed their focus on these answers and addressed the exact amount needed for different acids A certain amount of a particular base, and vice versa. By careful measurement they found that the amount of the faxed and explanation needed. There was no margon that food could count in the kitchen, where some ingredients have little or less, not very important. Instead one had some of the equal weight: a fixed weight of one compound reacts with a fixed weight of the other. Richter published his work in 1792. Two French chemists were disbelieved on a tough battle to see that this type of accuracy existed not only in the acid base, but by all chemistry. Put briefly: If a given compound was made up of two elements (or three, or four), then these elements are always present in the compound in the same set ratio or it may depend on the ratio preparation procedure? One of these, which help with the establishment of The Berthollet, modern chemical terms, thought the latest. According to the Berthollet approach, a compound containing X and y elements can be developed using a large amount of x if contains a large amount of x at most. The views of the opposite Berthollet were the opinion of Joseph Louis Prosat (1754-1826), who worked in Spain, secure (for some time) by the charm of the French Revolution. Using careful and principled analysis, Prosat demonstrated in 1799 that the tanbe carbonite, for example, contains the tanaba, carbon and oxygen in the weight-defined ratio, no matter how it was developed in the laboratory or how it would be isolated from natural sources. The ratio was always 4 oxygen and 1 portion of carbon per 5.3 parts of the tan. The same situation as so far went as to reveal that too dominant for many other compounds, and the tajanis that all compounds exist elements in certain proportions and not in other combinations, regardless of the circumstances under which they had established. It is called the law of fixed proportions or sometimes of the law of prosais. (Prosat also demonstrated that Berthollet presents evidence that some compounds differ from the way they are prepared according to their structure, which was incorrect because of the precise analysis and use of the product.) During the early years of the 19th century, it became clear that the pros thesis was correct. Other chemistry confirmed the clear ratio law, and it became the basis of chemistry [11]. From that time on, the law of the prosthesis was known. Very important. After all, why is the law of the set ratio true? Why do a specific compound always need to be made from 4 parts of x and 1 part of y, say, and never 4.1 x or 3.9 through part 1 of part y? If the matter is constant, it will be difficult to understand it. Why can elements be mixed in a slightly variable proportion? On the contrary, what if the matter were atomic in nature? A compound is set up when an x atom is added with an atom of y and otherwise not. (A combination of such atom will finally be called an inno, the Meaning of the Latin word on a small scale.) Then suppose that each atom weighs 4 times more than each atom. So, the compound will have to be 4 x and 1 part y portion. Such proportions will be required for a y atom to differ that little more or slightly less than the atom of x. Since an atom, considered as the time of The Magnet, was considered as a part of the indimitable case, it was inappropriate to expect that a small part could leave an atom, or a part of another atom could be added to it. In other words, if the case was made of atom, the law of proportion sated after it was eassented as a natural result. On the other hand, the fact that the law of explanation presentations was originally celebrated, it may be the exclusion that atoms are truly indimitable items. Dalton's theory helped english chemist John Dalton (1766-1844) carefully by his own discovery, understood this series of arguments. Two elements, they found, can be found, after all, in a greater proportion, in which case they exhibit a large change of the ratio of the collection and a different compound is set up in each change (see figure 9). Figure 9. Dalton signs for some elements and compounds. Hydrogen (1) Carbon (3) ; Oxygen (4); The tanba (15); Silver (17); Gold (19); Water (21). He was wrong about water, described as H20 instead of H20, but his formulas for carbon monoxid (25) and carbon dioxide (28) elements were correct as a simple example considering carbon and oxygen. The measurement shows that three carbon parts (by weight) will be found with eight oxygen parts for carbon dioxygen formation. However, three carbon parts and four parts of oxygen produce carbon monoacid. In such a case it is confirmed that the different amounts of oxygen that are done together with a fixed amount are related in plain intiform. Eight parts in carbon di-allied As many as four parts present in carbon monoacid twice. It is a law of greater proportions. Dalton, after seeing its existence in a certain number of reactions, published in 1803. The law of greater proportion fits the contrast with atomestock concepts. Assume, for example, the weight of oxygen nuclear is always 1-1/3 times the weight of carbon nuclear. If carbon monoxid is set up by a combination of a carbon atom with an oxygen atom, the compound must consist of carbon weight and three parts by four parts of oxygen. So, if carbon di-axed is made up of a carbon atom and two oxygen atoms, the ratio should naturally be three parts of carbon per eight oxygen. Relations in the form of simple attachments will reflect the presence of compounds whose constitution differs in full nuclear. Of course, if the case consists of small indimitable atoms, then it will be clearly different in their constitution that we would expect to find, and the law of greater proportions would make a perfect sense. When Dalton acknowledged his debt by maintaining the term atom for small particles, he acknowledged that his new version in 1803 is the magnet of nuclear theory based on clear ratio and rules of greater proportions. In 1808, he published a new system of chemical philosophy in which he discussed its nuclear theory in detail. In the same year its law was verified by another English chemistry research to more than one proportion, William Vallastown (1766 – 1828). Since then, Vallastavan had his influence on atomic theory and the time was generally accepted by Dalton's views. In this way, the possibility of transmoitaon in nuclear theory was an anthropological blow to believe (if any) in the alchemeical terms. All the evidence used to indicate the possibility that different metals contained a different type of atom. Since nuclear was generally counted as indimitable and anaeant, a led atom can be thought of changing a lead atom in a gold atom in any case. Because his leadership could not be silenced in gold [12]. Dalton's atom, of course, was too small to be seen, even under the microscope. Direct observationwas unimaginable. However, indirect measures can provide information on their relative weight. For example, a portion of hydrogen (by weight) was done in line with eight parts of oxygen to form water. If the water inu consisted of a hydrogen atom and an oxygen atom, then It is the emission that oxygen atom was eight times heavier than hydrogen atom. If it is decided to take the weight of hydrogen atom minmanae equal to 1, then the oxygen atom on this scale will weigh 8. On the other hand, if a portion of hydrogen is made up of five parts of nitrogen to make ammonite, and if the ammonite inu is made of a hydrogen atom and a nitrogen ino, it is the emission that the nitrogen atom weighs 5. Thus I argued, Dalton made the first table of nuclear weight. This table, perhaps its most important individual partnership, went very wrong on many points. The main dosh is the dalton that was set up by the atom of one element which is the same atom with the same atom from the other. He just went from that point when absolutely necessary. Over time it was seen, however, that a collection on one was not necessary the most common case. This difference of view showed himander ingered himly in the water before Dalton had suggested his atomic theory. Here, for the first time, power of electricity invaded the world of chemistry. The knowledge of electricity returned to the ancient Greeks, who found it by friction, gaining the power to attract light objects. Centuries later, English physics William Gulbrit (1540-1603) was able to show that it is not just The Amber that walks like this, but the other female has the power of attraction by their friction. Around 1600 he suggested that this type of substance is called electric, which means The Umber in Greek. As a result, a substance that obtains such power, rubs or otherwise, contains an electrical charge or electricity. French camecame charles francois de casterini du pre (1698-1739) discovered in 1733 that there were two types of electricity charge: a rose in glass (waterya electricity) and that could be created in an uber (resinous electricity). Taking a variety of female load, attracting these opposite types of people, while two females load the same type of papaya taking each other. Benjamin Franklin (1706-90), the first great American scientist, as well as a great statesman and diplomat, was suggested in 1740 as an electrical system. When a substance is involved in more than the normal amount of electrical fluid, it is present in one of two types of load. When it's less than normal, it's the other type. Franklin assumed it was more than the amount of glass electrical lying, so he assigned a charge. According to him, Resin made a negative allegation. Franklin's terms have been used since then, although they are used to the concept of current flow that is now actually located. Italian physicist Aliisandru Vallata (1745-1827) went one step further. In 1800 they found that two metals (separated by an electrical charge driving capacity solution) could be installed so that a new charge would be moved along with a kondactawei wire as soon as possible. Thus he invented the first electric battery and developed an electric current. The current two electrical metals and intermediate solutions were maintained thanks to the chemical response involved. The first clear indication that The Work of The Vallata was something to do with electricity in chemical reactions, a proposal that was not fully developed until the following century. If a chemical reaction can produce an electric current, it seems that a power that is so far-off can include the opposite of the current and can cause a chemical reaction. In fact, after six weeks of his work being overtaken, two English chemists, William Nicoleson (1753-1815) and Anthony Carlsly (1768-1840), demonstrated the opposite action. They found that the gas bubbles were starting to appear on the bars of the kondkatavi metal through the water and they were introduced into the water. The gas published on a stick was one that appeared on hydrogen and other, oxygen. Indeed, Nicolesen and Carlssi broke the water into hydrogen and oxygen . Such analysis by an electrical present is called electro lysis. He had demonstrated the experience of the rheoras of the panded, which found hydrogen and oxygen to make water. They were set up like oxygen just twice that made it out, by collecting hydrogen and oxygen into separate tubes. Hydrogen was lamps by weight, for sure, but high volume water inno indicates that there may be more hydrogen atoms than oxygen. Since the volume of hydrogen was twice for oxygen only, it was appropriate to assume that each water inu contained two hydrogen atoms and an oxygen ino, because each one, dalton suggested. But still, it was still true that 1 part hydrogen (by weight) was done in line with 8 parts of oxygen. Then it was derived that an oxygen atom was eight times heavier than two hydrogen, and therefore sixteen times heavier than a hydrogen atom. If hydrogen is considered to weigh 1, the atomic weight of oxygen should be 16, not 8.3. oogodoro The Colson and Carlssi were strong with the work of a French-kyma, Joseph Luis Smylangak-Lussac (1778-1850), who changed the arguments. They discovered that two hydrogen numbers together to give water to 2 skins of oxygen. He went on to find out yet, in fact, that when the gasses are together to make compounds, they always do so in small unusual proportions. The Gay-The Sun of this Law of The Lussak Collection Volumes in 1808. The proportion of the entire number of water formations with hydrogen and oxygen seemed to be re-intheting that the water ino consisted of two hydrogen atoms and an oxygen ino. It may also be erguan, after similar lines of reasoning, the ammonia ano did not come from a hydrogen atom and a nitrogen atom combination, but from a nitrogen atom and three hydrogen atoms. Based on this evidence, it can be concluded that the atomic weight of nitrogen was not approximately 5, but 14. Let's consider hydrogen and the clone below. These two gasses collect for a third formation, hydrogen cloud. A volume of hydrogen is done in a mix with the volume of the clone, and it seems appropriate to assume that hydrogen-clouded inu is set up by blending a hydrogen atom with a single-clauren atom. Now assume that hydrogen gas consists of hydrogen atoms other than each other and that it is also a clone from each other and that the gas consists of a clone atom which is very different. This atom mate hydrogen to form the cloudid inu, removed away from each other too. Suppose we start with 100 hydrogen atoms and 100 cloudatoms, providing a total of 200 separate particles. 100 Hydrogen-Clouded Atom Mate to Form The Innos. 200 widely spasked particles (nuclear) are converted into only 100 very separate particles (inno). If spacing is always the same, we will find that a volume of hydrogen plus the clone (2 skins in total) will result only in the volume of hydrogen cloud. However, this is not the case. By actual measurement, a volume of hydrogen is a one-volume of hydrogen-cloud edited with a volume of the clauren to make two skins. Since there are two skins in the two skins starting at the end, it must have the same number of particles widely before and after. But it is assumed that hydrogen gas is not of separate atomic but hydrogen ino, each made of two atoms, and that the clone is composed of a-inu, two atoms. In this case, 100 hydrogen atoms will be present in the form of 50 widely spasked particles (inu), and 100-klofatom 50 different particles shaped. There are a total of 100 widely spaced particles between two gas, half of them hydrogen hydrogen and the other half-clauren-clauren. Combined, two gasses are grouped together to make hydrogen-courds, the atomic collection hydrogen constitutes the cloud ino. As there are 100 hydrogen atoms in total and 100-k8aa, there are 100 hydrogen cloud ino (each containing one atom of type). We now find that 50 hydrogen innowplus 50-kl of the inn syllable to shape 100 hydrogen-clouded innow. This is compatible with what is observed in the process: 3 hydrogen plus 1 volume of the clauren give 2 skins of two hydrogen clynoids. The above reasoning is that particles of different gasses— whether they are made from a simple nuclear or nuclear combination — are actually equally different, as we are doing again. In this case, the equal number of particles in a gas (at a given temperature) will always give equal volumes, regardless of gas. First of all, the assumption identified the need for gasses, the equal number of particles occupying equal volumes-Italian chemist Amadev Oogodoro (1776-1856). The assumption, suggested in 1811, is therefore known as The Oogodrav Akhyatarama. Considering this prepared, it is possible that the difference between hydrogen atoms and hydrogen atoms (a couple of atoms), and other gas atoms and atoms. However, for half a century its over-design ingwas was ignored after The Oogodreu, and the difference between atoms and inns of important gas elements was clearly not described about many chemicals, thus unsurely fortabout the atomic weight of some of the most important elements. Fortunately, there were other keys to finding nuclear weight. In 1818, for example, a French came together, working, A French came the Camea, Pierre Louis Doloing (1785-1839), and a French physics, The Alexis Thése Petrette (1791-1820). They found that the specific heat of the elements (increased after the absorption of a certain amount of temperature) seemed to differ inversely with nuclear weight. This is, if the element x element had atomic weight twice, the temperature of element x would increase only half as high as the y element, after absorbing both the same amount of heat. It's atomic heat law. Thus, it is also enough to get an idea to measure the specific heat of an element of unknown nuclear weight, even to assess this atomic weight. This method worked For solid elements, and not for everyone, but it was better than nothing. Also, a German camia, Ealhardt Mitsherlich (1794-) 1819, similar structure compounds are for crystallleae with each other, as if combined with an inno, similar setting, with the other. It was a dissolube of the law of the asumoryasm that if two compounds were known to be crystallise and one of them was made together, the latter could be structured like this. This ownership of the Asumorefaq Crystal allows the printers to correct mistakes that can only be created by considering the weight of the collection, and worked as a guide to nuclear weight correction. 4. The decisive point of weight and symbols came with The Swiss chemist Joons Jacob Berzilyus. He was primarily responsible for the establishment of atomic theory after Dalton. Around 1807, Berzilios set out to determine exactly the elemental constitution of different compounds. Through hundreds of analysis, they provided many examples of clear proportions of law that the chemistry world could not doubt more than its accuracy and had to accept, more or more happily, that the law was created directly from the atomic principle. Berzelewis had then begun to determine nuclear weight with more advanced methods than Dalton. In this project, Berzilyus used the same as the Gay-Lussak Collection As a Law of Skins, and the results of The Peter and The Lischerll. But he did not use the aogodreo's perspona. Published in The Berzilyus' first nuclear weight chart, 1828, today can be faced with popular values, except in two or three elements. One of the important differences between the Table of Berzelewis and Dalton was that The values of Berzelewis were not generally untrue. Dalton's values, under which 1, based on the consideration of the atomic weight of hydrogen, were all fundamentally. In 1815, that all elements were eventually made hydrogen (they initially made a proposal anonymous) to suggest English chemist William Prout (1850). Accordingly, different elements were different weights as they consisted of different numbers of hydrogen atoms with clompaed. It was called Prout. The Table of Berzilyus seemed to end this attractive predisposition (therefore it reduced the growing number of elements in a fundamental substance, in the greek style, and thus seemed to increase the order and balance of the universe). Based on a hydrogen equivalent to-1, the atomic weight of oxygen was about 15.9, and hardly Oxygen as set by fifteen tenth degrees of another hydrogen atom. During the following century, improved atomic weight tables were published, and The Discovery of Berzelewis shows that the atomic weight of the various elements are not entire attachments of the atomic burden of hydrogen became increasingly evident. In the 1860s, for example, Belgium-Chemistry Gene Beruis Stas (1813-91) more accurately determines nuclear weight than Berzelewis. Later, in the early twentieth century, American chemist Theodore William Richards (1869-1928), took brilliant precautions, found values that could represent the last possible approach by pure chemical methods. If Berzilyus's work left some doubt, Stas and Richards' didn't work. The non-numeric values of nuclear weight just had to be accepted, and every finish of Prout seemed a little more dead. However, The Richards did not complete the results exactly when the matter was raised again in its entire breadth. Atomic weight had to be completely re-modified, and was born of its own abyss of peritude, because we will see later. The fact that different nuclear weights not only put to measure weight with the right question of the correct path with it. It seemed logical to assign hydrogen equal to a nuclear weight 1, and both Dalton and Berzelewis experienced it. But this is the 15.9 of the 15.9 of its illegal and painful nuclear weight again. After all, it was oxygen in which the ratio was used to determine which different elements were noted, which was in the same way with many of them. To give the oxygen an atomic weight equal to a fully number was the least interference with hydrogen-1. its weight was changed to 15, A 16. A. In the O system was 16, the atomic weight of hydrogen was approximately 1.008. The oxygen-petering lasted until the mid-16th century, in which more than one logical one was accepted, making very minor changes in nuclear weight. Once the nuclear theory was accepted, the substance can be represented as containing innos with a certain number of different elements. It was very naturally easy to try drawing numbers of small circles representing each type of atom by a certain type of circle of Simbolizhang. Dalton tried something like this. He represented oxygen atoms by a simple circle; There was a circle hydrogen atom with a central point. A vertical line with a nitrogen atom; a black circle a carbon atom, and so on. As it was difficult to invent enough different circles for each element, Dalton left something appropriate lying pointed with the letter. Thus, the sulfer consisted of a circle that had a P, and so on. Berzilyus noticed that circles were more and more and initially there are only one sequences. He suggested, therefore, that each element should usually represented the element be a valid symbol for an atom of the element, and this name was included in the initial Latin name principle of the element. If two or more elements were the same initial, one of the following letters of the name can be added. Chemical signs of elements were thus established, and today there is consensus in the only symbols that are accepted internationally. Chemical symptoms of carbon, hydrogen, oxygen, nitrogen, force and salfer are C, H, A, N, P and S, inter-s. The chemical symptoms of calcium and clauren (preferably carbon on the same capital) are Ca and Cl, in the same case, and in the same case. The symptoms are less obvious when latin names differ from castalans. Thus, chemical symptoms of silver, murkri and sodeme are Ag (arcantom) and Hg (hydrargirum) and Na (natrym) . It is easy to use these symptoms to indicate the number of nuclear inhe inno. While they all contain a water inno contains two hydrogen atoms, a h2. If the water inu consists of two hydrogen atoms and one oxygen atom inno, it is H2O (the inometerless systems represent an atom). Carbon dioxide CO2 and s04H2 glanal acid s04H2, while hydrogen is cloudy is ClH. The chemical formulas of these simple compounds are planitaong themselves. Chemical formulas can be found to define the configuration and response of chemical equations. If we want to express the fact that carbon is done in a mix with oxygen for the formation of carbon dioxide, we can write: C + O2 — > CO2. Such equality must ensure that the Law of Mass Protection of Lawasier is all nuclear allied with. For example, the equation above starts with two atoms of C (carbon) and O (oxygen ino) and ends with one atom of C and two atoms of O (carbon di-axide ino). But suppose you want to show that hydrogen is done in line with the clauren of hydrogen cloudmaking. If we only cheful H2 + Cl2 — > HCl it may be the exclusion that initially there are two hydrogen atoms and two-color atoms, but finally one of each. To write a narrow chemical equation, you must set: H2 + Cl2 — > 2 HCl. Similarly, to configure hydrogen and oxygen combination water, we can create a manager equation: 2 H2 + O2 — > 2 H2O5. Meanwhile, the current power, which was used by Nicoleson and Carlsly with such good results, has also produced new spectacular results in isolation of some new elements. After the definition of the element given by the boel century and half, the amazing amount of ingredients was discovered according to this definition. Further, the fruststanged ones, the most precocious of it was clear that there were some chemical items that the chemistry could not read in isolation. Elements are often found in combination with oxygen (e.g. oxygen). It was necessary to take away oxygen for the release of the element. If a second element with a strong connection to oxygen was introduced, it left the first element to join the second element. This method was found to work, with carbon often driving this role. Thus, iron, which is essentially iron-based acid, can be heated with a cook (a relatively pure form of carbon). Carbon drew oxygen from the iron oxide [illegible] acid, an accepted organic substance. It was then made by a procedure that a fixed line of chemical change can be produced from final products, carbon, hydrogen and oxygen, the last product, acetic acid. This recipe from elements or total composition is the maximum that can be said for chemistry. The urea recipe by W'hler is not solved so left to the question of power of life, the kolka recipe. French-Camera Pierre Eubrithelot Ne Marine (1827-1907). During 1850 they demonstrated the composition of organic compounds in a systematic manner, making some tables. They include these well known and important substances such as mital wine, yatal wine, maithen, benzene and acityini. With Brithlot, turn off for a brave rhela to become the forbidden pure routine to cross the line between inorganic and organic. The organic compounds with which life is built but established by W'hler, Cole and Brithelot were all relatively easy. The most speciality of life was more complex substances, such as naesta, fat and protein. These were less easy to handle. Its preciseelement structure was not easy to determine and generally presented the fertile field of organic chemistry as a real strong problem. At the beginning of these complex substances it could be said that they could be divided into relatively simple units or brick, thin acids or their heat with the add-ons. The main one in this field was Russian camera, Magartin Fried-E-Chaan (1764-1833). In 1812 he succeeded in changing the nastase (heating it with acid) in a simple sugar that he finally called glucose. In 1820, French Henri Braconnot treated The Jalytin in the same way and got the compound Glycean. It contains nitrogen that is an organic acid and belongs to a group of substances called berzelewis amino acids. The same was Glysian but some twenty different amino acids, all of which were isolated from proteins in the next century. Both the nasta and protein contained giant innos (finally known) from long chains of glucose or amino acid units, inter-se. The 19th century chemistry laboratory was able to do a little bit in the sense of building in such long chains. This case was different with fat. French-based 60-year-old Michael Eugchioriol Ni (1786-1889) spent the first part of an unbelievably long professional life investigating fat. In 1809 he has treated heating fat with alkali with acid, and is now edilised called fatty acid. It appeared that later when the fat is converted into soap, the glycerol is separated from fat. The Galiserol is a relatively simple inno on which there are three logical anchor points for additional groups of nuclear. By the 1840s, therefore, it seemed very logical to assume while the naistas and proteins were made from a large number of very easy units, it was not the case with fat. Fat can be constructed with only four units, a glycerol inu, and three fatty acids. This is where The Brithlot intervention is. In 1854 he encountered one of the most common fatty acids achieved from glycerol hot, fat with stereic acid, and an inu set up by a unit of glycerol attached to three units of stereic acid. It had proved to be the same for the triad, which was the triest, from the same natural fat. It was the most complex natural product in time. Brithelot departs to take even more spectacular steps. Instead, the stryc acid took acids that were similar, but were not achieved by natural fats. They heated it with acid glycerol and lots of fat like normal fat but are known in nature to be all different from grease. This recipe appeared that chemical sine die products can do more than re-present [14]. It can go further and prepare for all its features in organic lying, but they were any of the organic products produced in living categories. During the second half of the 19th century, these aspects of organic chemistry were brought to truly amazing heights. (See chapter 10) the non-amazing, divided into organic compounds by the mid-20th century and Based on the activity of living people, it became a fission. There were organic compounds that were never handled by a biology. However, the distribution was still useful, because there were significant differences between the two classes, very important that the organic chemistry techniques were completely different from the inorganic chemistry. It has become increasingly clear that the difference is hidden in chemical structure, because two completely different types of innos appear to be involved. Most of the non-organic matter handled by 19th century chemicals made up of small inno two to eight atoms. There were very few non-organic innos that reached a dozen atomic swells. Even the easiest ino of organic matter was made up of a dozen or more atoms; Mostly for several dozen. As for substances like nashesa and protein, they literally contain heavy inno secans which can count their atoms by hundreds and hundreds of thousands too. It's no surprise, then, complex organic inno easily and arreorsable can also be forcibly broken by un-ruptori forces, such as soft heating, while simple inorganic inno remainfirms under very harsh conditions. It was also increasingly necessary that all organic matter, without exception, contained one or more carbon nuclear in their inno. Almost all hydrogen atoms are also included. As carbon and hydrogen were jellenschel, it was not surprising that a significant part of them is also a jallanshell. This is German chemistry Friedrich-August Kestradonatz (1829-86), commonly known as Ke, who took the logical step. In a 1861 book published, he determined the chemistry of carbon compounds as organic chemistry. Non-organic chemistry was again the chemistry of carbon-free compounds, a definition that has been generally accepted. It remains true, however, some carbon compounds, including carbon di-exide and calcium carbonnet, are more like common non-organic compounds than organic ones. Such carbon compounds are usually treated in non-organic chemistry books. We, and the extremists, have found simple non-organic compounds involved in the great chemical development of the 20th century easier in atomic terms. It seemed enough to indicate the different types of nuclear present in each inu and number of each inno. You can write oxygen inno like 02, hydrogen cloud like ClH, $S0_4Na_2$, etc. such as THE NH_4 SUDAM SALPLOT. Such formulas, which provide only the number of atoms of all kinds present in the inno, are set by the abstract section formula (the word abstract section means experiments). It was natural to believe, in the first half of the 19th century, that each compound had its own abstract section formula, and two different compounds could not have the same abstract section formula. Organic matter, with their large inno, were cumbersome from the beginning. The abstract section formula of the marfin (if compared, a fairly simple organic compound, for example, for proteins) is now known as $C_{17}H_{19}N0_3$. It will be very difficult, perhaps impossible, with its techniques in the early twentieth century, to decide whether the right one was it or, $C_{16}H_{20}NO_3$. The abstract section formulas of acetic acid, much easier ($C_2H_4O_2$) than the marphine, caused great controversy in the first half of the 19th century. However, to learn something about the molecular structure of organic matter, chemistry had to start with the abstract section formulas. In 1780, Lawasier tried to determine the relative proportion of carbon and hydrogen in organic compounds through carbon di-exide and water burning and their production. Their results were not very accurate. In the early 19th century, gay-lusexak, the collection introduced an improvement of the law of skins, and his fellow French camely-Louis-Jacks Thénared (1777-1857). They found organic matter with an oxygenagent, such as potasshim chalorati. Thermally, this combination produces oxygen, mixed with organic matter, due to its rapid and most complete recuse. Carbon di-axed and water formation, gays-Lussak and Thénared were able to determine the relative proportion of carbon and hydrogen in the original compound. Only the data from Dalton's theory can be described in atomic terms. Many organic compounds are made of only carbon, hydrogen and oxygen. Once carbon and hydrogen were masked and the presence of oxygen was considered to explain any suo-mail, the abstract section formula can often be determined. By 1811 gay-lussak was acquired, for example, some simple sugar syllable syllable formula. This procedure was later improved by German chemistry, Jostos-van Labbig (1803-73), who, in 1831, clearly resulted in reliable abstract section formula [15]. Soon after the day, in 1833, French chemist Jean-Bappatta Andre Dauma (1800-84) modified the procedure that allowed chemists to also collect nitrogen in dahan products. his Nitrogen ratio can be detected in an organic substance. This study of organic analysis has achieved the result in their course of research that ended up belief in the importance of the abstract section formula. It happened like this: In 1824, Labbig studied a group of compounds, W'hler (who would later be close friends with labbug and soon synthesise urea), was studying another group of compounds. Both reports sent by a magazine of their work by Gay-Lossak. Gay-Lussak warned that the abstract section formulas given for these compounds were the same and that, however, the properties were very different. For example, silver consists of a silver, carbon, nitrogen and oxygen atoms in both Kanyanati and Silver Dasisana. Gay-Lussak informed this observation of Berzilyus, then the world's most famous chemists. But Berzelewis discovered that two organic compounds, rockimac acid and targolok acid, while having different characteristics, seemed to be the same abstract section formula (now known to be $G_4H_6O_6$). As elements existed in the same proportion in these different compounds, Berzilyus suggested that such compounds we called the part (meaning the Greek word equal proportion), and the advice was adopted. Other cases of asumeresm were discovered in the following decades. It seemed clear that if two inno were made of the same number of atoms of each type, and if they had different characteristics, the difference is how the nuclear was bound within the inno. In the case of simple innos of the best known non-organic compounds, it may be that the only order of nuclear in the anu was possible. For this reason, we could not be given the component, and the abstract section formula would be sufficient. Thus, H_2O will be water and nothing but water. However, in the most complex organic inno, there were various rooms for variety and therefore we partly for. In case of case, different systems are easy to discover, because each ino contains only a few atoms. Silver can be write to Kanyanati, while Dasisana is aganka. There are only four atoms. When the amount is high, the number of possible types becomes too large that it is difficult to decide whether each of them is consistent with the compound. Even the case of rockimac acid and tarano acid, with sixteen atomic in their innous, were very difficult to handle in the first half of the 19th century. The situation will only be impossible (so it will seem to be when) when considering Even older. The problem of pollution structure should be left without any hope, as soon as the true nature of the problem was detected, was likely to make it easier not to create. From 1810 gay-worked with Lussak and Thénared Hydrogen (CNHS), it proves that it was an acid, although it did not contain oxygen (this, along with the near simultaneous discovery of the same fact about hydrochloorak acid, denial Lawasier believes oxygen acid was a feature factor) Lussak and Thénared, gays, found that cn combination (followed by anide group) separates the atom from carbon and nitrogen. In fact, the CN collection works in the same way as an isolated atom of the clone, bromana, etc. at that time that the sudam approach (CNNa) had some characteristics in common with sudeme cloud (CINA) and sudeme bromide (BrNa). Two (or more) a term that comes from a radical, Latin word meaning root was found as a group of atoms they were passing each other by an ino called. The reason for this name was in the belief that the ano could be constructed from a limited number of small nuclear collections. Then the particle will connect to which the inu will grow, to speak. Of course, the CN group was very easy, but the group worked together, explaining a much more complex case. They discovered that the benzoyl group can be moved from an inu without destroying it. The abstract section formula of the Benzoyl group is currently known as C_7H_5O. In short, it was seen that to solve the structural mystery of the large inu, a certain number of different extremists had to be solved first. After that, the particles of the inno can be built without much harder (expectedly). Things were boosted! Chapter 7 Molecular Stokrikontant: 1. Type Theory 2. Polynesia3. Structural Formula 4. The uptotheomy we have been part 5. Three-dimension moleculars1. The Barzilyus type rule affirmed the idea that the extremists from whom organic inno were made could be units. He thought that organic innos were made from radicals, such as inorganic inno-individual atoms, and came to think that the radicals were almost as indimitable and umt. Berzilyus maintained that the power that unites the atom in an inorganic inno or had electricity in an organic radical nature (which will eventually become true). Then every inu had to be a part . And a negative part, since the opposite was just the attraction between the elements of the load. The concept of simple non-organic matter such as sudam-cloudy, positive and negative proves to meet the facts in the end. To get into organic matter for this, Berzelewis had to insist that the particles contain carbon and hydrogen alone, with negative carbon and hydrogen positive. For this reason they maintained that the radical benzoyl (C_7H_5O) did not contain oxygen, which was converted by this radical study. Berzelewis also believed that it was impossible to change a positive factor without changing the properties of the compound. This latest statement immediately proved it wrong. Deoma was a passionate defender of Berzelewis, but The Students of Daoma, Dominic Laaron (1807-53), was able to change some of the hydrogen atom in the ino-wine-clauren with Yital. This experience hit The Theory of Berzelewis deadly, as was considered negative to the clone and hydrogen positive, and can still be changed with each other without changing the properties of this compound. Also, this clone compound was to be connected directly with the clone in carbon and, if both were negative atoms, how was it possible? Negative electrical charges are in curing each other. After the same reasoning, how can two-kiloren atoms join each other to make a single-screen ino? These problems were not clarified until a century later, because we will see later. Berzilyus, stubborn and extremely conservative in his later years, refused to change his mind. Learning the report of The Laars, they attacked the new findings. In 1839, The Deoma itself took the place of the clauren on the site captured by three hydrogen atoms in acetic acid. However, in the face of opposition to Berzilyus, The Deoma-Bzdilana Makar did not acknowledge the work of The Laars. But The Laars stood firm and continued to gather evidence that there were no extremists as a lazier, as was the case with the stable Berzelewis, and the question of positive and negative should not be overestimated. Berzelewis's anger was taken from the most famous laboratory, and while Berzilyus lived, his version of the basic principle continued by the sole power of his personality. In 1848, when Berzilyus died, his theory died, and The Theory of The Lord gained popularity. The laars were stopped insisting on power forces altogether. He had an organic anu (which could be an atom) in which various extremists were linked. Organic inno can be grouped into such families or types (hence the name type rule). All members of a kind have the same base, which can include a series of similar extremists; and there were many possibilities for change within the extremists. A certain molecular type can also expand the non-organic circle. For example, the water ino (H_2O) can be set up by a central oxygen atom (its center) for which two hydrogen atoms were attached. If a hydrogen atom is changed by different particles in a series, a type of compound will be set up that will include water as well as different organic inno among its members. If a hydrogen atom will be changed by a mital group (CH_3) or yatal group (C_2H_5), CH_3OH (mital wine) and C_2H_5OH (Yatal wine), etc. Many other taamana carbohydrates can be built in the same way. And in fact, the teratomycarbohydrate is not just a lot of similarity to each other, but, as a class, they also show specific similarity with water. Simple secancarbohydrates, such as mital wine and yatal wine, are mixed with water in any proportion. Similarly with sudam metal water I respond with tapartancarbohydrate, more slowly, etc. Between 1850 and 1852, English chemist Alexander William Williamson (1824-1904) has shown that the family of organic compounds can also be formed according to the type of water. In this case, two hadero-o-sofas of water were changed by organic particles. The common ether, which was then used as another unconscious doer, has been converted by the two heddering groups, so its formula is C_2H_5O C_2H_5. Earlier, in 1848, French chemist Charles Adolapea Wortz (1817-84) studied a group of compounds related to ammonia called Amanos. It proves that they belong to a man with a nitrogen cover. In ammonia, a nitrogen atom was attached to three hydrogen atoms. In Amanas, one or more of them had been changed by TheD-2018 organic extremists. The type of rule has gain fame because it can be used to manage the growing number of organic compounds. Published in Russian German chemist Friedrich Conrad Belsian (1838 – 1906), a vast campendium of 1880 organic compounds and used the type of lawof the lares to organize such compounds within a rational command. However, the theory, emerging from the work of The Lord, was incomplete. He still used extremists as an awadad and without addressing the question of molecular structure. It had to be done to solve it correctly For the question: What is the real atomic thing within the same particle? 2. The Type theory of The Velinehas influenced some chemistry that the oxygen atom was always done in alliance with two other atoms or particles. It can be done in a dissoctomy with two hydrogen atoms to form water, a hydrogen atom and an organic radical to make an ether. But in any case the oxygen atom joined two entities. Similarly, nitrogen atoms were always made in a mix with three atoms or particles. Coal and other chemicals started writing formulas for organic compounds in which such a stay was reportedly in the number of oxygen or nitrogen bonds. The fact that the English chemistry was widespread by Edward Frankland (1825-99), first to take interest in the Orgometal compounds, in which organic clusters bound to metal atomic as zinc [17]. It was very clear here that each metal atom can only be attached to a certain number of organic groups and that this number is different for different metals. Zinc nuclear, for example, was made in close co-ordinating with exactly two organic representations. In 1852, Frankland suggested that later on the principle of the xaraf is known as (the Latin word means power): each atom has the power of a fixed collection. For example, under normal conditions, a hydrogen atom will be found with each other. It is also true for sudeme, clauren, silver, bromana and potassium. All of them have a sin. Oxygen atoms can be made in a dissosal nuclear, calcium as well as, salfer, magnesium and bereme atom. All these elements have a sift of 2. Nitrogen, forsaforce, aluminium and gold have a snare of 3. Iron can be a snare of 2 or 3, and so on. In the long term, The Question of Polynesia revealed that it actually didn't seem to mean as much, but this simple version of its rule already had the invaluable value covered. Among other things, the concept of the xerf helped to clarify the difference between nuclear weight and weight equal to the element. Even in the mid-19th century, many both concepts confused chemistry. The permantal can be shown that a part of hydrogen is done in a 35.5 parts of the country with a cline, after tying a hydrogen atom with a single-clauren atom to make hydrogen cloud, and the clauren atom is 35.5 times heavier than this hydrogen. That is, the clone has a nuclear weight of 35.5. But a part of hydrogen will be found with all the elements in their nuclear weight ratio. For example, 16 of oxygen has a nuclear weight, but each oxygen contains two atoms of the atom Oxygen is a snare 2. Therefore, 16 parts of oxygen are 2 parts of hydrogen. Oxygen equivalent weight is the amount of oxygen that is done in a part of hydrogen, i.e. 16/2 or 8. Similarly, nitrogen atoms, with an atomic weight of 14 and a 3-sofa, are done in collaboration with three hydrogen atoms. Nitrogen is equal to weight due to 14/3, or about 4.7. Generally, the weight equal to an atom will be divided by its serf to its nuclear weight. In addition, Faraday's second law states electrolysis that the weight of metal released by a certain amount of electricity is proportional to the weight equal to that metal. This means that a certain amount of current amount of electricity will be released only at half by a zero metal equivalent to 1 nuclear weight compared to just a xaraf metal 2. The situation can be explained that the electric atom needs to be taken by an anaeawant atom, while two is required for the bawalaant atom. However, this connection between Zarif and The Atomic Power was not widely recognized for half a century after that. Kezraf's structure formula applied the concept with special interest to the structure of organic inu. Started with the suggestion that carbon has a 4-year-low, and on that basis the simple organic inno structure that departed in 1858, as well as extremists. This concept is due to graphic representation of Scottish chemistry orchebuild Scott Per (1831-1892), which is proposed to represent between these combined forces (links, as they are commonly called) in the form of small stroke. In this way, organic inns can be built as true-make-up structures. This representation made it very clear that organic innos were generally larger and more complex than non-organic inno. According to the idea of the ck, carbon atoms can bind each other through one or more four zip bonds, long, linear or tied chains. No other atom seemed to enjoy its speciality for such a carbon marked degree. Thus, three simplest hydrocarbons (set up by an inu-only carbon and hydrogen atom), which are mathen (CH_4), ethanule (C_2H_6) and propane (C_3H_8), four b Each carbon atom provided with the nod can be represented, and each hydrogen atom is provided with one, in this regard, in practice the carbon atom continues to add oxygen, with two bonds, and nitrogen, With three, Yatal Wine Inu (C_2H_6O) and Mithelamana Anu (CH_5N) as follows: Such structural formulas can become more flexible if two adjacent nuclear or three bonds (one triple link) are allowed. Thus, Ethy (C_2H_4), Aciataini (C_2H_2), Meital Based Anide (C_2H_3N), acetone (C_3H_60), and Acetic Acid (C_2H_40) 2) Can represent the following: Structural formulas show such a clear utility that many chemists accepted them immediately, trying to represent organic inno completely in a complete lying way. Now nothing less than a nuclear representation of atom can be made. In particular, a Russian camera, Alexander Makaylovach Bottleraova (1828-86), supported the new system. During the 1860s, he warned that using structural formulas could explain the existence of the components. For example, to use a very simple case, yatal wine and damethel ether, although they have very different characteristics, are the same abstract section formula: C_2H_60. The compounds are structural formula: it is not surprising that the change in nuclear bound goes towards two very different sets of features. In the case of alcohol yatal, one of the six hydrogen atoms is bound to an oxygen atom, while all six in the Damethel ether are set for carbon atoms. Hydrogen atoms are attached to the weaker oxygen atom than carbon, so that the metal sodium is added to the Yatal Wine Agency to make absolutely a vacation of hydrogen material. If sodium is added to the damathel ether, it does not displace any hydrogen. Thus, chemical response suppheration acts as a guide to the formula, and the formula on the other hand serve as a guide to unknown responses. The botleravow is specifically dealt with a type of asumeresm called tautomereía, in which some materials are always called a mixture of two ingredients. If one of these ingredients was purely saturis, then it could change immediately, in part, in the other. Bottlerao indicates that the tautomerea consisted of a close (and negotiated) carbon atom from a link to an unusual transfer of a hydrogen atom belonging to one. Benzene, a simple hydrocarbon whose abstract section is formula C_6H_6, was a major problem in the early years of structural formulas. No structural formula seemed to meet the needs of the serif, and at the same time explains the great stability of the compound. That is, structural formulas already suggested in other compounds to those who were very unstable. Again it was what Situation. As per kekulé (1865) a day, half a hundred on a bus, they started performing a dance. Suddenly, a chain edume joined his head and formed a circular ingot. By then, structural formulas had only set up with carbon atom chains, but now I thought of the possibility of carbon ringing too. He suggested the following structural formula for benzene: Explanation was accepted, and the structure formula would be considered before it would be at any time before the basis comfortably [18]. Despite their utility, the electrical we-part, Kekulam structure formula did not end the description of a particularly subtle type of asumeresm, in which light interference. Let's think briefly. In 1801, The Englishman Thomas Young (1773-1829), an extraordinary character who was the first to understand the phealyalgy of the eye, experiments were held that it demonstrates light as if it consisted of small waves. Later, around 1814, French physics Oguston Jean-Frissonal (1788 – 1827) it appeared that light waves are known as a special type of transaurus waves. These waves swing in the direction in which the wave travels with each other. The situation is the best concept in respect of water waves, also of a transores nature. Each particle water is vertically run, because waves move horizontally. Light waves are not limited to a level, so they don't just move up and down. They can move left and right, or from northeast to southwest, or from northwest to southeast. In fact, there are an unlimited number of instructions in which light waves can swing at the right angle in the direction of your migration. In a normal ray of light, some waves are assaulting in one direction, in another, etc. There is no preferred address. But if this ray of light goes through some crystals, the setting of the atom inside the crystal will allow the ray of light to swing on a given plane, a plane through which and between the atom rows. A name presented in 1808 by French physics Aitian Luis Malus (1775-1812), a single aircraft called The Athcallatis that light the Polymeris light. Until then, the rupal theory was not accepted, and malwe believe that this light contains particles with the north and south alms, and that all the bhims in the pulaares light were based in the same direction. This theory disappeared immediately, but the expression was there, and it is still used. By 1815, The Features and Attitudes of The Poolares light seemed to be particularly concerned with the domain of the fax. In this year, French physicist Jean Bpatpati Biot (1774-1867) If that's if the Pallariz light goes through some crystals, the plane in which the waves have undergoes a turn. Sometimes it rotates the clock (diatrogy) and sometimes (lvógiro). Among the crystals that exhibited this property of optical activity were organic compounds. Also, some of these organic compounds, such as some sugars, appear to be in the eye activity when they were not crystal clear, but in solution. As it was exposed, there were substances that only differed in their visible characteristics. The rest alike, one of them can spin the plane of the Pallarys light clock, and the other. Sometimes a third cannot change it at all. We differed in the characteristics of the ingredients, clostoc acid and targlok acid, which was discovered by Berzilyus. Such a vision is described by we were not part well. The first indication of understanding the activity of the electrical activity was published in 1848, when french chemist Louis Passcher (1822-95) started working with the sudam ammonoc turray crystal. Passcher observed that crystals were aproportion: that is, there was a small face on one side of the glass that did not appear on the other. In some crystals, the face was presented to the left, in others, on the right. Using a macobaric crystal, they carefully separated the crystal with the nakchonty, and separated each group. Each group's characteristics were looked at alike, except for the visible activity. One solution was dextrógira, the other was the levógira. It seemed, then, that the activity of the electrical was a result of innomitability. And it also seems that the Plane of The Pallarez light was circulated in one direction or otherwise depended on having a right hand or left hand nomonism on the same crystal. This view was satisfactory in the case of Crystal, but what about the activity of the system of the system? The solution does not exist as a material crystal, but individually randomly as fluid. If the activity of the electrical is involved in the nonalist, such an immust exist in the same molecular structure. The kekka structure formula did not show the necessary notonosis, but this lack does not necessarily break the relationship between nomatonosis and visible activity. After all, the Kekey structure formula was written on a flat surface of the slate in two dimensions or on a piece of paper. And, of course, it is not expected that organic ino were the original two-dimension. It seemed true that nuclear in an inno In three dimensions, and in this case its supply can offer precise nomology for the display of the electrical activity. However, how to apply the three damansavanalati required by Anu? Nuclear was never seen, and their true existence can only be a coincidence, used to explain chemical reactions. Can their existence be trusted so that they can be divided into three dimensions ? He took a young man to take the next step, which was not yet achieved he knew that comes with that time. 5. Three-way ino this man was young Danish chemist Jacobos Handarocos Winco (1852-1911). In 1874, yet without completing his thesis for the doctorite, he said that four carbon bonds were divided into three dimensions of a space to four peaks of Tethadaraon. Chitra 11. Carbon nuclear's tethadaral bonds allow two sequences of nuclear in compounds, being a shiny picture of each other. This model shows the shiny imageing arrangements of The Lactic Acid Ino, CH_3 $CHOCCO_2H$. To see this, let's go that three carbon bonds are placed like the legs of a soured tripod, while the fourth link directly points to the top. Each simantra then links to the other three, and the angle between a link and its neighbors is approximately 109 degrees (see figure 11). Four bonds of carbon atom are placed around the baqerina atom, and the nomentomy is only introduced when each of the four bonds is set to a different type of atom or organic group. Four links can then be available in exactly two different ways, being a similar image of each other. This model was clearly found in crystal sire of the provided nomausoniti on the passcher. Almost simultaneously, French chemist Joseph Achali Le Bell (1847-1930) published a similar proposal. Tethadreal carbon atom is sometimes called as a distance. The Tethahadrall atom has stated many things and was thus clearly accepted. The book German Chemistry published in 1887 was participated in by Adolf Vassicanos (1835-1902), who took over an ancient and highly respected scientist in support of the theory. Above all, there was no such fact. Compounds that were abounded by carbon atoms (bound by four different groups) had a vision activity, while they did not lack such atom. In addition, the number of the components of the component was equal to the number offered by the rule of forever In the last decades of the nineteenth century, the three-dimension concept of bonds spread out of carbon atoms. German chemist Viktor Meyer (1848-97) it has appeared that the bond of nitrogen nuclear, pregnant in three dimensions, can also explain specific types of the electrical asumarams. For its part, English chemist William Jackson Pope (1870-1939) showed that similarly, the sulfer, salinium and tan, german Swiss Alfred Warner (1866-1919) had other nuclear lying as the cobalt, chromem, rahudyum and other metals. (In early 1891, The Warner developed a theory of support for molecular structures. The idea, according to him, came to his sleep, getting up two in the morning with a start. Basically, this theory maintains that the structural relationship between nuclear does not need to be limited to the common links of the serf, but in some relatively complex non-organic groups in particular nuclear can be distributed around some central atom, according to specific geometric principles that the general xerf link does not seem to take into account. Along with this, The World's harmony was about half a century about the concepts of the zarif to add both simple compounds that fit the concepts of compounds.) The idea of three-faceted structures was due to rapid further development. Victor Meyer had shown that while the clusters of atoms can move freely around a single link that carries them to the rest of the ino, the size of nearby atom groups can sometimes prevent such rotation. This situation, called a karvi barrier, can be compared to a door that rotates on its gemmes in general, but is blocked by some barrier that is placed behind it. The pope has gone so far to show that this barrier resulted in it being so disproportional to the inno. It can then show the activity of the political, even if no constitutions were strictly aproportional to nuclear. German Camera June Friedrich Wilhelm used three-dimension representation in Adolf-vin Bayyar (1835-1917) in 1885 to the carbon atom rings flat. If four bonds of carbon atom point towards the four peaks of a tethradaron, the angle between either of them is approximately 109.5 degrees. Bayyar said there is a trend in any organic compound to allow carbon atoms to connect in such a way as to maintain their natural angle. If the angle is forced to differ, the atom will be targeted for effort. Of three atoms The ingoti will form a sayings-atotatal triangle with angle between each pair of links equal to 60 degrees. This separation is very different from the natural angle of 109.5 degrees, and therefore 3 carbon rings are difficult to make and are formed once, easy to break. A 4-carbon ingot will form a square with an angle of 90 degrees; a 5-carbon ingot will form a multiple type with a 108 degree angle; a 6-carbon ingot will form a hexagon with an angle of 120 degrees. It seems that a 5-carbon ingot has almost no power on carbon atom bonds, and a 6-carbon ingot only needs a small power. The baayyar tension principle seemed to explain the timeof such ringing in nature due to the maximum of 6 or more than 5 atom rings. The most spectacular of all the works was probably this done in 1880 on the chemistry of German-german-ameel-fisher (1852-1919) simple sugars. Many known sugars share the same abstract section formula $C_6H_{12}0_6$. They usually have many characteristics, but differ in others, especially in the intensity of their visible activity. Fisher demonstrated that each of these sugars had four aproportional carbon atoms, and based on that based on the theory of winco-off-le-bell, at that time sixteen of the other will be the part of us. These are the part of the eight pairs. In each pair we will rotate the ship of the partial Solaris light clock, with exactly the same intensity with which the other will end it. The Fisher sixteen we set off to establish exactly the arrangement of the atom in each of the components. The fact is that for the six carbon sewets that are clearly divided into sixteen parts, divided into eight pairs, together there is a strong test which has the right to support. The prediction swells its accuracy, in the case of amino acids and any other types of compounds. The description of molecular structure over three dimensions by the 1900s, after its accuracy was proved, was globally accepted. Chapter 8 Distance Tablavantanant: 1. Elements in Randomness 2. Organization of Elements 3. Filling in difference 4. New elements by Groups1. Elements in disorder have a sensitive parallel between organic chemistry and inorganic chemistry stories, in which in the nineteenth century. The first decades of the last century saw a dismal spread in the number of organic compounds, and also in the number of elements. The third quarter of a century saw the world of organic compounds, thanks for that. They also saw this The world of elements, and at least part of the resinofa of both changes, was due to a specific international gathering of chemistry. But let's start at the turn of the century with your current illness. In addition to the discovery of new elements, known for the ansansandas and studied by four medieval alkymastes, mentioned in Chapter 4. Gas elements, nitrogen, hydrogen, oxygen and clones were all discovered in the 18th century. And that's the co-balat, platinam, the natkal, the manganage, the tongsatan, the moulamundanam, uranium, the tittiium and the chromemium. In the first decade of the 19th century, more than fourteen new items were not listed. Among the chemicals already mentioned in this book, Dewey had isolated at least six by electrolysis. The boy, Lussak and Thénared, were isolated. The vallastavans were isolated and a good obeisam, while Berzilyus discovered The Seriam. English chemistry Sumatrasavan Tennant (1761-1815), for which Vollastavan worked as an assistant, also discovered osmne and adium. Another English chemist, Charles Hatokhet (approx. 1765-1847), Owasad Columbia (now officially called Nobuyum), while The Swiss Chemistry Anders Gustav Ekeberg (1767-1813) discovered The Tantillam. Figure 12. The list of 54 elements known and discovered in the Berzelewis era, with their atomic weight, is counted on the basis of oxygen equal to 16. (From the sea to the elements, the basic books.) The pace was not so strong in the decades that were going on, but the number of elements continues to increase. Berzilyus, for example, discovered four more elements: Salinium, Silcan, Jaronia and Toryum (Picture. 12). Louis Nicholas Vauquelin, in 1797, discovered Barelim. 1830 was known by 55 different elements, a good step from the four elements of ancient theory. In fact, the numbers were too large to disturb chemicals. The elements differ widely in their characteristics, and seemed to command a little between them. Why were there many ? And how much more will be discovered by now? Ten? Hundred? Thousand? An unlimited number? It was attractive to find the order in the first known elements. Maybe that way you might find some reason to explain their number, and some way of justifying the change of their property properties. The first German chemist to capture a glimpse of the order was The Yuanus Wolf Dubrener (1780-1849). In 1829 he observed that the Bromana element, discovered three years ago by french cameo Séclère Jérôme Balord (1802-76), which were only half between the chlauren and iodine, are characteristics. (Iodine was discovered by another French chemist, Bernard [1777-1838] in 1811.) The color, bromana and iodine not only showed progressive gradiation in such color and racuta features, but the atomic weight of the bromana appeared only between the color and iodine for midnight. Will it be a coincidence? Dubrener went to find two other groups of three elements that exhibit edited clear gridathanus of characteristics: calcium, struntyum and barim; Salfer, Salinium and Talyurium. The atomic weight of the second element in both groups was half between the other two. Is this a new coincidence? Dobrener called these groups triads, and looked at others towards Bartha. The fact that five saathas of known elements could not be placed in any of the treads to decide whether the results of the dobrener were just agreed. In addition, chemicals in the way nuclear weight chemical properties between elements of the dobriner triads did not usually affect. In the first half of the 19th century, nuclear weight was made. They were easy to calculate chemicals, but for example, making lists of items seemed to have no reason to use them. It was also doubtful that nuclear weight would be useful in chemical calculations. Some chemicals did not differ from the atomic weight detail of maximum molecular weight. Other atomic weights and equal weight shaved did not make the difference. Thus, oxygen weighs 8 equal to 8, its atomic weight is 16, and the molecular weight is 32. Chemical calculations, equal weight, 8, are the most assisted. Then why use 16 items to keep oxygen on the list? This confusion between equal weight, nuclear weight and molecular weight not only on the question of list of elements, but usually extends to chemistry study. Differences about relative weight led to differences on the number of atoms of each element in a given inno-different atom. Kekemea, after a while he led structural formulas to publish his suggestions, realized that the idea was nothing if it had to start with, on the formulas of the abstract section, it would not be launched. He suggested a conference of key chemicals from across Europe to discuss this. As a result, the first international scientific meeting was held in history. It was called the first International Congress of Chemistry and met in the German city of Karlsrohe in 1860. 140 delegates participated, including Italian chemist Satanaslao Kannesezaro (1826-1910). Two years ago, Kanneseza Their country man Ovegodre. It is understood that the Oogodrav adhesive can be used to make the difference between nuclear weight and molecular weight from the major gas elements, and this difference will usually serve to clarify the question of nuclear weight of the elements. In addition, he understood the importance of highlighting nuclear weight by equal weight. In Congress he made a huge presentation on the subject, and then in detail the description of his arguments, the distribution of the leaflet. Slow and disso-at-tremable, his opinion swayed supporters in the world of chemistry. Since then, the question of atomic weight was clarified, and the importance of Berzelewis' atomic weight chart was defined. For organic chemistry, its development means that scientists now continue to understand the abstract section formulas and include details of the structure formula, first in two dimensions and then in three. The way it was done is described in the previous chapter. The results were just as useful as the result of inorganic chemistry, as now there was a rational command to arrange elements according to their growing nuclear weight. Once it is done, the chemistry can look on the meadada chart with new eyes. 2. In 1864 the organization of elements, English chemist John Alexander Reina Newlands (1837-98) ordered known elements according to their growing nuclear weight, and observed that this appointment also at least put the characteristics of the elements in partial command (see figure 13). The vertical columns of seven were arranged by the elements, living in a similar horizontal row. Thus, potassium was close to sudam like her. Slineam was left as a salfer in the same line, very similar; Calcium near magnesium, and so on. And indeed there were three men of the Dobrener among them in these rows . Newlands said that octawas law (in music, seven notes form an octio, with the eighth note is a copy of the first and start of a new octave). Unfortunately, while the rows in this table include similar elements, others contain very different elements. Other chemists thought which New Lands was trying to prove was more than a coincidence. He could not publish his work. Two years ago, French geologist Emele Beivir de Chaincoortos (1820-86) had also ordered elements according to their growing nuclear weight and divided them into a variety of cylinder graphs. Here, too, similar elements to meet in the vertical column in court. He published his work, but not his chart, and his education Also, do not notice (see figure 14). The most successful German chemist was Julius Lothar Mayor (K-95). Mayor consider the volume captured by certain fixed weights of various elements. Under such conditions, each weight is included in the same number of atoms of its element. This means that the reason for the skins of different elements was equal to the amount of simple atom made to these elements. So, one can talk of atomic skins. Representing atomic skins of elements according to atomic weight, a series of waves reached maximum values in alkaline metals that were achieved: sudam, potassium, rubadium and cesium. Each will make the descent and minimum maximum number of items in the table according to a period. In each period, other physical features are also low and rose, in addition to atomic volume (see figure 15). Figure 13. Published in Octawas Law, 1864 J. A. A. By A. Was on the table of the distance of The Mandileo. Hydrogen, first on the list of elements (because it has the lowest nuclear weight), is a special case, and can only be understood to last the first period. The mayor's table is one of seven elements consisting of the second and third periods, and the New Lands' Law of Octawas once again. However, the next two waves contain more than seven elements, and it clearly showed that NewLands made a mistake. The act of octawas cannot be forced to enforce the entire table of elements strictly, with seven elements in each horizontal row. The last few periods had to be longer than before. The mayor published his work in 1870, but came too late. A year ago, Russian Camia Drnitri Awawach Mandiliyo (1834-1907) had also discovered a change in the length of the periods of the elements, then went on to demonstrate the results in a particularly spectacular manner. Figure 14. A surplus stroke was the result achieved by The Begvir de 1862 Cancovartos, arranging elements by their atomic weight and similar characteristics that exist. Mandileo Karlsrohe was writing his thesis in Germany at the time of the Congress, and was one of those who heard his views on nuclear weight kanneseaaro. Back in Russia, they also started studying the list of items according to their growing nuclear weight. Mandiliyo attacked the problems from the point of view of the block. He said the first items on the list have shown a progressive change in their valanas. That was, a body of hydrogen 1, 1 of the latime, 2 of barilym, of 3, of carbon 4 2 slufer, 1 fluoride, sudeme 1, magnesium 2, aluminum 3, salcan 4, force 3, oxygen of 2, 1's of the color, and so on. The period down and down was far: first, hydrogen only. Then two of the seven elements are each; there are more than seven elements in the periods. Mandileo used his information to build graphs, as made by mayor and behaver de Chaancoortoas, but a table like New Lands. Figure 15. The mayor's chart represented a fixed weight of different elements. This distance table of elements was clear and maximum than a chart, and avoided the mistake of insisting on such equal periods by Mandileo. Mandileo published his chart in 1869, published his work a year ago (see figure 16). But the reason is that the maximum reward in the discovery of the distance table is attributed to it and not the other partners, is not just a matter of priority, but in its excellent use of the board's mandileo. Chitra 16. The first edition of the Mandileo distance table, published in the Journal of Russian Chemical Society, was forced to put a slightly higher nuclear weight element in front of a single atomic weight in one or two cases, in order to meet the same position in 1869.In order for elements. Thus, the talureom (atomic weight 17.6, Polynesia2) had to be placed in front of iodine (atomic weight 126.9, Xerf 1) to keep the taloro in The Xerf column 2 and the iodine column in the xerf 1 [20]. As they were not short, he discovered that it was necessary to leave the whole difference in the distance table. Instead of considering their differences as flaws in the table, Mandileo has not yet seen the representatives of elements as they dandanata. In 1871 it was set in a certain way in three holes: those that were modified this year, have been next to aluminum and salcan elements in the table. He stressed that they should also name unknown elements, who insisted that the word 'A' - Biju, Aka-Aluminium, Aka-Salkan (The word 'Aka Sanskrit' means one) from these coreresponses. He predicted many features of such elements, injecting predictions that should be made from the bottom of the above elements and differences in the table, thus completing the following and two burner reasonings. Chemistry has been a defeat in the world, and maybe it was not bad mandeleo's bold prediction so it will continue to be. This It was first due to the use of a new chemical instrumentalinus: the spectroscopy. 3. Filling in space in 1814, a German-based outnation, Joseph v. F.R. F.R. (1787-1826), faced the best perams that he prepared. This light is caused by a first shift through the dare, and then through its triangulated glass peramus. They found that a spectrum of colours had been created in light which had crossed a series of dark lines. He counted about 600 of these lines, carefully recording their positions. These lines were inorder to provide wonderful information in the late 1850s, thanks to German physics Gustav Robert Hechsen (1824-87), working in cooperation with German Camera Robert Willhem-Busen (1811-99). The main source of light he used, invented by The Bunsen and discovered since any student starting in the chemical lab. It burn a mixture of gas and air to create a hot, dissonant luminous flame. While the crystals of different compounds in flames are turned off, they burn with different color light. Since it was passed through the light prism and separated into bright lines. Chitra 17. The spectaclescopy, which was used in the discovery of various elements, trained researchers to compare the light line spectacle of the tapadipat metals. Every element, Kirchhoff appears, I creates a model that is different from another element a model a feature of pattern editlines. Thus it was invented a way of getting an element fingerprint by the heat-dyed light. Once the elements were identified, they were able to change their reasoning around it and get the elements of an unknown crystal out of the bright lines of the spectrum prepared by it. Such elements are used to analyze a spectrumcopy (see figure 17). As we know today, light occurs as a result of certain phenomena located inside the atom. In each type of atom, this trend is in a certain way. Therefore, each element will give a specific wavelength of light and another. When light affects steam, the same phenomena that occur inside Bukhari's atom are found in the river. The light of a certain wavelength is absorbed instead of re-eothesion. The Moryosis are involved in the same phenomena in both cases (in one case, in the opposite direction to the other), as absorbed by steam in a set of wavelengths of light are exactly what another set of custom steam will give The dark lines of the sunlight spectrum were most likely due to the absorption of light from the body of sun's heat by the gasses from its relatively cold environment. The vanps from the solar environment absorb light, and the resulting black lines could emit from position that the elements in the solar environment were present. The sun that was used to show the spteroscopy (as well as stars and interstellar exposed gas materials) was made up of similar elements for these people of the earth. This result finally argued Aristotled that the heavenly bodies were made of a different kind of substance than those set on the earth. The spectrumscopy introduced a powerful new way to detect new elements. If a well-established mineral revealed the workof the workof the Workman lines belonging to a single familiar element, it seemed appropriate to assume that a new element was at stake. When The Bensen and the violent Chhon checked this hypothesis, in 1860, they checked a mineral with unknown workman lines and started to study it in case it was a new element. He found the element and proved it to be an alkaline metal, related to sudeme and potassium in its properties. He said this saism, the Latin word means the sky blue, because of the color of the most prominent line of its spectrum. In 1861 he repeated his victory by exploring another alkaline metal, the meaning of the Word Rubayum, Latin red, by the color of the spectrum line once again. Other chemistry started to use this new device. One of them was French chemist Paul Emele de Boasboudran (1838-1912), who studied the crange of his native Pyrenees through The Spteroscopy for fifteen years. In 1875 he tracked some unknown lines and found a new element in zinc. He called him The Gallam from Degall (France). After a while they developed enough amount of new item to study its properties. Read the communication of Mandeliyo Lecoq de Boasbadran and immediately said that was the new element but had its own axa aluminium. Subsequent investigations confirmed the identity. Mandeliyo's prediction of the properties of the axa-aluminium corerispounded in all of them. The other two elements offered by Mandeliyo were found by old techniques. In 1879, a Swiss chemist, Lawrence Friedrich Nalsaon (1840-99), discovered a new element called scandia. When their features were published, one of Nalsaon's colleagues, The Svedas Khimaper Kalawei (1840-1905), immediately pointed to his likeness to explain the mandeleo of The Aqa Biju. Finally, in 1866, a German camema, Kevins Alexander (1838-1904), analyzes a silver body, found that all known elements have reached only 93 per 100 of its weight. Investigating by the remaining 7 100, they found a new element they called from Germany. It came to be a salkan of Mandeliyo. Thus, within fifteen years of mandelio's explanation of three unknown elements, all were discovered and its explanation was found to meet with amazing accuracy. There can be no doubt after that, after that, the utility or the utility of the term table. The new group elements the Mandeleo system still faced the effects of finding additional new items for which it may, or may not, be found in the distance table. As of now 1794, for example, The Pheneesh Chemist Saia hon. Because the new earth was so much less common than silka, boulder, and macedonia, its name was given the new earth. Godualllan called his own aausid atrabak into the ear of the original. Fifteen years later, the atrabak factor was achieved. The extraordinary earth was analyzed in the mid-19th century of the khanazi and was found to contain a complete group of elements, the so-called rare port. The Swiss chemist Carl Gustav Musandara (1797-1858), for example, discovered four rare 1940s less in the late 1930s and early decess. They were The Lanthanam, Erbio, Terbio and Dadamo. In fact, there were five, because 40 years later, in 1885, The Australian Chemist Carl R. Barron-van Babakh (1858-1929) found that Dadamo was a mixture of two elements, which he called prosiudamo and newdymium. Lecoq de Boasboudren discovered two others, In Samarau, 1879, and Desparyum in 1886. Kalaoi also discovered two: Hulamao and Tulio, both in 1879. From 1907, when the French chemist George Yorbin (1872-1938) was discovered on the rare lotitome earth, fourteen such elements were discovered in a total number of such The very similar chemical properties were the very common veins, and all had 3.5. It can be assumed that they should all enter the single column in the distance table. But such an order was impossible. There was no column sufficient for fourteen elements. In addition, fourteen rare portwas very close to nuclear weight. Based on atomic weight, all of them should be placed in a horizontal row in the same period. It can make room for them in the holiday period, which was much more than the fourth and fifth, as if it were more than the second and third. Similarity in the properties of the earth of the earth However, without explanation until 1920. Until then, the lack of clarity cast some shadows on the table. There was another group of elements whose existence was completely unpredictable during the time of Mandeliyo, and which did not create much trouble . Actually, they are fully fit in the distance table. His knowledge came with the work of English physics John William Strowt, Lord Raeliagea (1842 – 1919), in 1880, who was measuring with the care of the atomic weight of oxygen, hydrogen and nitrogen. In the case of nitrogen, it got nuclear weight that is different through gas. Nitrogen in the air appeared to be slightly higher than nitrogen from clay compounds. A Scottish camera, William Ramame (1852 – 1916), became interested in the problem and he recalled that The Panded, in a long forgotten experience, had tried to amasses nitrogen from the air with oxygen. He realized that in the end bubbles a gas was released that in no case could be done in a company with oxygen. These last bubbles cannot be nitrogen. Will it be nitrogen, as is usually pulled from the air, as a dirt and contains a little disser gas, and that the gas made nitrogen in the air that you would expect to look a little heavier than? In 1894, The Ramme Makar-Panded experience and applied analytical devices that were not with The Panded. Ramame heated the final gas bubbles and did not study the bright lines of his spectrum. Strong lines were in positions that mixed those of unknown elements. It was thus formed by a new gas, compared to nitrogen, which is 1 by 100 of the volume of the environment. It was chemically non-normal and could not be made to react with any other factor, so it was called argon, the meaning of the Greek word static. Argon made out to get an atomic weight just under 40. This means that it had to fit anywhere in the distance table in the area of the following elements: the salfer (nuclear weight 32), the clone (nuclear weight 35.5), potasshim (nuclear weight 39) and calcium (only above 40 nuclear weight). If argon's atomic weight was the only condition to take to account, then this new element should go between potasshim and calcium. But Mandeliyo had established the principle that the jaraf was more important than atomic weight. Since Argon was not shared by any factor, it could be said that it was a 0.0. How do you fit in? The sulfer is 1, 1, potasshim 1, and calcium 2. Development of Polynesia in this area of The Meyada meez 1, 1, 2. A sift of 0 will clearly fit between two: 2, 1, 0, 1, 2. So argon alone cannot exist. With a family's sin, the same non-normal gas house had to be. 1. A family of this kind with the bi-veneration of the halongs (chloren, bromana, etc.) and alkaline metals (sudeme, potassium, etc.). The shape will fit between no. 18. Today, the timetable separates elements by their atomic number (the number of existing ones in The Protons) and includes elements discovered since the time of Mandileo, and which are artificially born after World War II. The Remmame investigation started. In 1895 he learned that a gas sample (taken by nitrogen) was from a uranium mineral in the United States. The ramame repeated the work and it was found that gas, spectrumoscopy was checked, which were not related to nitrogen or argon. The most striking thing was that these lines were observed in the solar spectrum by The French Haguamud Pierre-Joels Canonson (1824-1907) which happened in 1868 during a solar solar eclipse. At that time, The English Hagomud Joseph-Narman-L'Okil (1836-1920) attributed him to a new element he called Helyam, the Greek word means sun. Chemistry had generally paid less attention to the time to discover an unknown element, which is as delicately evidenced as the spectrumoscopy. But The Work Of The Remame Appeared That The Same Element Was On The Ground And He Put The Name Through The Block. Helyme is a lamp of high-gasses, and, after hydrogen, the element of low nuclear weight. In 1898, the sample of static gasses will bubble up to carefully resinthe snow liquid air, which hopefully will bubble first. He found three, which he called Nein (new) and Anon (alien).

Static gass were initially counted as just the tascent, only of interest to the chemicals attached to their Iori Tower. But in 1910, French chemist George Cloud (1870-1960) began that an electrical force through certain gas present thus creating a soft, colored light. Such gas-filled tubes can be swayed in alphabetical, word or drawing letters. In the 1940s, a great white path was celebrated and changed by the neon light of other similar entertainment centers in New York City. Chapter 9 Physical Chemistorization: 1. Heat 2. Chemical dynamics 3. Catholic 4. Ionic Viewgen 5. More about Gases1. Summer, worlds in the 17th and 18th centuries And the physics seemed mutually well-fixed. Chemistry was a study of changes that involve changes in molecular structure. Physics was a study of changes that did not include such a change. In the early part of the 19th century, while Dewey was accused of changing the molecular order of non-organic compounds and Brithelot in this change of organic compounds, physics was studying heat flow. This study of heat flow was called dynamics (greek words mean heat movement). The field was outstanding english physics James Prescott Joel (1818-89) and German physics Julius Robert v. Mair (1814-78) and Hermann Ludwig Ferdinand van Helmholtz (1821 – 94). His work in the 1840s made it clear that the frontof the front of the walkassatis faced with heat and other forms of energy, no energy is destroyed or generated. This principle was called the first principle of energy conservation, or dynamics. Later came the work of French physics Nicolás Leonardo el-Saadi Carnot (1796-1832), English physics William Thompson, later Lord Calyon (1824 – 1907), and German physicist Rudolf Julius Aminville in Clasius (1822 – 88). It was shown that heat, abandoned itself, from one point to high temperatures for each other at a low temperature, and such heat flow from heat work exists through differences in the temperature can only be achieved at this time. This sample was usually to apply in any form of an energy flow at a low intensity point from a high intensity point. The term durability of the Clausius is set in 1850 to designate the heat ratio included in an isolated system for its absolute temperature. This shows that any unusual energy increases the system's gravity. This goes by the second principle of dynamics. Such development in the field of physics could not be isolated from chemistry. After all, apart from the sun, the biggest source of heat in the 19th century world is in chemical reactions such as wood, coal or oil release. Other chemical reactions also produced heat, such as base acid base. In fact, all chemical reactions include some kind of thermal transfer, either from heat (and sometimes light) from the atmosphere, or from heat absorbed (and sometimes light) to the environment. I came up with 1840 chemistry and physics worlds and started marching together with a Russian Swiss chemistry work, The German Henry HS (1802 – 1850). He released the results of careful actions he had prepared in the heat. Chemicals between certain quantities of matter. It was able to show that heat production (or absorption) was always the same from one substance to another, no matter how much change had occurred in the chemical path, or in how many stages. Due to this (ajanis) this law), he is sometimes considered as the founder of the temperature chemistry. Based on the law, it seems highly likely that the energy conservation law will apply to both chemical changes and physical changes. In fact, by Gonarlejiang, the laws of dynamics should probably be implemented in both chemistry and physics. This line of experiments and reasoning is that chemical reactions—such as physical actions — are an inherited and unusual direction in which durability grows. But duramys is a hard amount to measure directly, and the chemistry that can work as a measure of driving force looked for another simple quality. In the year 1860-69, Brithlot, who had done important work in organic composition, focused on the tarmocomamy. He demonstrated ways to perform chemical reactions inside the chamber surrounded by water at the famous temperature. By increasing the temperature of the surrounding water at the end of the response, the amount of heat prepared by it can be asked. Using this type of calbrithelot meter (measuring heat meaning from the Latin word), the amount of heat produced by hundreds of different chemical reactions received careful determanatans. Independently, Danish chemist Hans Peter Jörgen Julius Tahomesan (1826 – 1909) conducted similar experiments. Brithlot thought that the heat was released, were unusual, while their heat was not absorbed. When any response released heat, after developing in the opposite direction (Lawasier and Laplace), they were the first to express such opinions), any chemical reaction could only be in one direction, in the process the heat begins. For example, let's say that when hydrogen and oxygen are combined to form water, the reaction is very hot. This reaction is unusual, and, once started, comes to an end, immediately with explosive violence. On the contrary, the inactive process of water analysis is required to supply energy in hydrogen and oxygen. Energy can be provided in the form of heat, or better yet electricity. However, such a break of water inno is not unusual. It never seems to be until energy is supplied, and yet the response is over When energy flow is obstructed. But while the tanjanism of Brithelot seems to appear at first look, it's wrong. First, not all unusual reactionrelease heat. Some absorb so much heat that drops to the temperature of the atmosphere. Second, there are reversible responses. In them, the substances A and B can react to as well as the materials C and D, while C and D can also react in the resin, A and B. And all this happens even if the heat released in such a reaction should be absorbed in reverse response. A simple example is hydrogen iodadi in which hydrogen and iodine are broken. This compound is then able to reassemble to make hydrogen iodadi. It can be written in the form of an equation: 2HI < > H2 + I2. The double arrow indicates that it is a reversible response. The reaction of the reversible was already known as The Time of Brithelot. It was first studied by Williamson in 1850 during the work that led to his findings about Athorse. They found that the conditions were set up with a mixture of one and b of ingredients C and D. Instead it started with a mixture of C and D, females A and B were established. In both cases, in the apparently fixed ratio, the mixture of A, B, C and D will eventually be. The mixture will be in balance. But Williamson didn't think the structure of the mixture was apparently accurate, nothing happened. He thought that a response from A and B was in the form of C and D, while C and D responded to make A and B. Both responses were constantly progressing, but give each one a balance of the bar, the other's effects are neutralized. This condition was a dynamic balance. Williamson's work marked the beginning of the study of chemical chemicals, i.e. the study of the speed of chemical reactions. It was very clear from Williamson's work that the dynamics of chemical reactions was imposed more than just the evolution of heat. It was something that was already being investigated when Brithlot and Thoumasan demonstrated their numerous cala metric measurements, but unfortunately the subject was buried under a little familiar language. In 1863, chemical dynamics norwegian chemistry how the maximilian guild (1836 – 1902) and Peter Umar (1833-1900) published a leaflet dealing with the meaning of unusual reactions. They came back to the proposal, which means a response that depends on the mass of individual females who participated in it half a century ago. Thought of guild and teenager Did not form a massive whole answer. Rather, it was a question of the concentration of the substance with each other the amount of one item collected in a certain amount of reaction mixture. Suppose A and B can react to forms C and D, and can also do so to make this C and D form A and B. The double reaction can be represented as: A + B <> C + D. Such a situation is an example of one of Williamson's reversible responses, and in situations where one, B, C and D are found in all systems to reach balance. The balance point rate is dependent on which A and B react (speed 1) compared to the rate in which C and D react (speed 2). The speed of duty is much higher than 1 2. In this case, A and B will react fast, leaving a small amount of C and D, while C and D will react slowly and generate a small amount. In a short time, more and more will become another BC and D, not the other way around. When the reaction is reached to balance, C and D will be pre-domainal in the mixture. Let's see the equation above we can say that the balance point is shifted right. When the speed is much higher than 2 1, the opposite is true. In this case, C and D will react to produce a and b much faster than a and B will react to c and D. In balance, A and B will prevail and the balance point will be moved to the left'. But speed 1 depends on how often an inu with an inu-collacts it, may only react based on this collision and even then that it will not always happen. Also, speed 2 depends on how often a C ino-collabs with the ino of D. Suppose that another One or B (or both) is added to the system without changing its volume. Detention of A or B (or both) has increased, and there is now a high chance of a collision between them (as soon as a highway is filled in an early hour when compared to when relatively empty in the middle of the morning). Thus, by increasing the detention of one or B or both, the speed increase to 1; The reduction in detention will be slowed down like this, increase the detention of C or D, or both, increase the speed 2. By changing the speed 1 or 2, the composition of the mixture can be changed to balance. If the concentration of any of the participating substances changes, the position of the balance point will change. Although balance can be revised to a focused extent of A, B, C and D One or more of these ingredients was added or extracted from the mixture, gill'anvariant and the gill found that one element could be defined. In balance, the focus on one side of the double arrow and the other side of the double arrow remains constant, due to the current material focus equation products on one side of the equation, as it is. This ratio is called a balance constant. For example, let us suppose that we are dealing with, that in balance: The symbol K represents balance constantly, given that a reversible response is the feature it is prepared at the fixed temperature. Reversiable was a proper guide to understanding the response, which is much more than The Wrong Suggestion of Brithelot, more than that. Unfortunately, Gulde and Koomar published their work in Norwegian, and was unknown until 1879 when it translated into German. Meanwhile, American physicist JoBlack Wallared-Gibz (1839-1903) was organized to apply the laws of dynamics to chemical responses and a long work series was published on the subject between 1876 and 1878. The Biggs developed the concept of free energy, an intensity that involved both heat material and durability in itself. Any chemical reaction changed the system's free energy. When free energy refused, dirty always increased, and the reaction was unusual. (The free energy utility is enamoured in the fact that its change is easy to measure by the change of inability.) The change in heat content is exactly on the amount in which free energy is reducing an unusual response, so that the heat is released. But sometimes the change of free energy and durability had increased such heat content, and then react, albeit unusual, absorbed energy. Biggs also showed that the free energy of a system created systems that changed the concentration of the substance to some extent by different. Suppose the free power of A + B is not very different from C + D. In this case, the small amendment introduced by the detention changes may be enough to create free energy of a + B compared to C+ D on some focus, and less than others. This response can progress in one direction, and in the opposite direction for others, in one way, in the direction of focusing on one side. The rate of change in free energy is different as the concentration of a given substance is the chemical potential of the substance, and the Biggs showed that the chemical potential of the force was the driving force in chemical reactions. A chemical response is different from a point of high potential of a low-potential approach, just as heat is flowing from a high temperature point to low-temperature fever perspective. Thus, The Biggs gave the meaning of the mass action law, as it appears that the amount of potential chemicals of all the substances involved in this balance was minimum. If it starts with a + B, the chemical is configured as the top of the potential. If it starts with C + D, it's a + B configuration. In balance, the low portion of the energy valley between the two peaks had reached. The Biggs continuously added to the chemical system issued to apply the principles of dynamics for the balance between different stages (liquid, solid and gas). For example, liquid water and water vapor (one component, two stages) may be present with each other at different temperatures and pressures, but if the temperature is set, pressure is set as well. Liquid water, water vang and ice (one component, three stages) can only be found in a certain temperature and pressure. The Biggs developed a simple equation, the phase rule, which predicted how temperature, pressure, and different components could differ in all combinations of focus components and stages. Such chemical dynamics were established, such detail and perfection that was done for little Biggs' successor [21]. However, despite the basic importance and remarkable beauty of The Job of The Biggs, it was not immediately recognized in Europe since it was published in an American journal in which European experts had ignored the field. Catholics in the last quarter of the 19th century, Germany was at the top of the world in studying the physical changes associated with chemical reactions. The most important scientist in this field of physical chemistry was Russian German chemist Friedrich Wilhelm Ostwald (1853-1932). Thanks to him more than anyone, physical chemistry was recognized as a discipline in his favour. By 1887, he wrote the first book on the subject and founded the first magazine specifically dedicated to the subject. Ostwald does not realize much of the first Europeans to explore and appreciate The Work of The Gebs, which translates its communication on the chemical staked out in 1892. Ostwald then worked to apply Thesis of The Gubs about the Catholic trend. Catholics (a word suggested by Berzilyus in 1835) is a process that has the speed of any chemical reaction Sometimes there seems to be too much to participate in the reaction by the presence of small amounts. Thus, platinam powder was discovered, in 1816, as an addition to the hydrogen for the constellation oxygen and various organic compounds, such as The Dawey (which contains a sodium and potassium sutran). On the other hand, as an acid analysis of different organic compounds with starch, is organized at the end of the katalisas, as first demonstrated in 1812. At the end of the response, platinum or acid stake still exists in the original amount. In 1894, Ostwald summarized the work of another writer and published it in his journal. He has completely disagreed with the author's findings, and to strengthen his disagreements he discussed the ... He said That The Ones Of The Gbs Suggested That The Substance Involved In This Practice Could Be Involved In Accelerating The Response Steaming Without Changing And Maintaining The Energy Relationships Of The Substance Sown Should Be In Close With Rectoonang Substances To Make An Intermediate Compound, Giving The Final Product. The intermediate will release the break-up of the compound, which will thus restore its original shape. Without the presence of this intermediate compound set up with The Property, the response will be much more slow, sometimes so much so that it will be restoic. Therefore, the impact of the uppree was to speed up the response without using itself. Also, as the same Atapapereti Ano was reused and again more, a small amount of The Ayu was enough to speed up the response of a very large number of the abyss. This concept of the cellcis still stands and has helped explain the activity of protein appetizer (or crude) that controls chemical reactions in living agents [22]. Ostwald was a very opponent of the atomic theory (but the influence of the physicist and philosopher Emest Mach (1838 – 1916), who believed that scientists should only deal with materials that were directly mown, and should not make models based on indirect evidence. For this reason, Ostwald refused to accept the reality of the atom, as there was no direct evidence of their existence. He was the last important scientist to combat nuclear theory (although he did not deny its utility, of course). And here he made his appearance on stage on the subject of the Baranwani movement. This trend, which includes rapid and random movement of small particles suspended in water, was first celebrated in 1827 by A Scottish bothaniston, Robert Brown (1773-1858). German Swiss physics Albert Einstein (which I demonstrated in 1905 that this movement can be attributed to the bombing of particles by the inu of water. As at any time you can Hitting more inno than the other from one direction, now such particles will be working here. Einstein developed an equation to calculate the actual size of water inno after measuring the specific properties of the moving particles. Jean Buppatpati Parran (1870-1942), a French physicist, undertaken necessary measures in 1908 and got the first safe estimate of the innos and therefore the diameter of the atom. Since the Baranwani movement was a reasonable direct observation of the impact of individual inno- it was until Ostadada had to give up his opposition to nuclear theory. Nor was there only one Ostwald who accepted the value of The Biggs in the 1890s 99s. Dutch physics-chemist Handarach William Bakhos Rozeboum (1854-1907) promotes the Rule of the Gbs phase across Europe, and did most effectively. Also, The Work of The 'Gbs' was translated into French by Henry Louis Le Sakhalter (1850-1936) by 1899. Li Katlaaheler, a physicist-chemist, for his statement today, in 1888, for a rule, which is still known as the le-katlaaheler principle. It can be set as follows: Each change in one of the factors in a balance means that reducing the impact of the change means a system afterscompatibility. In other words, if pressure has increased in a balance system, it is as readjusted to take up as little space as possible and thus reduce pressure. If the temperature is increased, a heat absorption change occurs, and therefore decreases the temperature. As shown, The Termite erased the principle of The Bug's chemical dynamics. The late discovery by the 'Europeans' did not prevent the full development of chemical physics, as many of the Biggs discover was independently rediscovered by the 1880s-89s, which had previously become famous in the world of chemistry with the Tetahadradral carbon atom. My side was just before Ostwald in the field of physical chemistry. He worked on solutions issues in particular. Around 1886 he was able to demonstrate the innos of dissolved matter, moving randomly through the mass of liquid, behave in a sense according to the laws governing the behavior of the gasses. Chemical responses related to the new study of physical chemistry not only for heat, but for energy in general. Electricity, for example, can be developed by chemical reactions and, as a result, causes chemical reactions. Wallenhermann Nernst, a German (1864-1941), applied the principles of dynamics for chemical reactions located in one In 1889 it appears that the current production properties can be used to calculate the change in free energy in chemical responses that current lying generates. Light was another form of energy that could occur in a chemical reaction and, as in the case of electricity, could cause chemical reactions. Specifically, the light could break down some silver compounds, release the black grain of metal silver. Such light-encouraging reactions were studied called light chemistry (light chemistry). By the 1830-39s, silver was allowed to develop a technology for photo recording action. A silver compound on a flat glass is briefly exposed by a focus lens on a scene in light (or a bad (later a flexible film). The different points of the silver compound are in front of different amounts of light, according to the amount shown by it or this view in view. Short exposure to light increases the decrease for metal silver in reducing the trend of silver compound; Light light, more and more this trend that marked. Silver compound is then treated with reagents which reduce metal silver. Completes the more rapid reduction in the area in front of the bright light. If the disclosure stops in the right time, the black light of the silver grain can be covered by black areas (silver grain) and light areas (retained silver compounds) which is negative of the original view. Later on the theory and chemical action need not be described here that finally got a real graphic representation of the scene. This process was called photography (writing with light). Many men played a major role in new technology, including French physics (1765-1833), French artist Louis-Jacks Mané Daguirry (1789-1851) and English-based english-based william henry foo boot (1800-77)... More interestingly, however, the light can behave almost like an uppree. A small amount of light was able to blend hydrogen and chorin to react with the violence on explosives, while there was no response in the dark. The explanation for this tremendous difference in attitude was finally suggested by Nernst in 1918. A small amount of light is enough to break a chorin in two-chorin atom. A hydrogen atom (more active only as part of an ino) removes hydrogen atom from hydrogen inu, to create a hydrogen-cloudirin eno. Other hydrogen atoms, isolated, one-klorein ino to one-klorein atom sanatx, atom It has a hydrogen out of a hydrogen ino, and so on. Very little amount of light is thus responsible for a chain graphical response, which goes towards the explosive stay of a large number of hydrogen chalhauridade inno. 4. Next to Ionic Viogen was another master of newborn physical chemistry equivalent to Ostwald and Vinco, The Swiss Chemist Svante August Arhoniss (1859-1927). As a student, Arhoniss changed his focus on electrolytis: that is, his solution is able to take an electric current. Faraday had established the laws of electrolysis, and decided by them that electricity could exist in the form of small particles in cases such as electricity. Faraday had a talk about the ions that could be considered by a dissolved particles that take electricity. However, for the next half century, neither he nor anyone pull solving these inns to work seriously on the nature. Which did not mean, however, that no worthwhile work was done. In 1853, German physicist Jon Wilhelm Hatorff (1824-1914) said that some ions were traveling faster than others. These observations led to the concept of transportation number, the current speed of different ions electricity on which. But the calculation of this speed could not reflect the nature of the ions. Arhanois found a way of dealing with the matter through the work of French Camia Francois Mary Raoulet (1830-1901). Like Raoulet, studied solutions. With the establishment of his education in 1887, now called the Law of The Raoult: The partial vaup pressure of solvents in balance with a dissolution is directly proportional to the molar fraction of solvent. Without entering the definition of the part of the molecule, it is just to say that the rule allows the ions to assess the relative number (whether atom, inu, or mysterious) in which the dissolved substance (solution) and liquid in which it was dissolved (solvent). During this investigation, Raoult had scaled the frozen points of resolution. Such frozen points were always lower than the frozen point of pure solvent. Raoulet is organized to show that the number of alcohol particles present in its proportion has decreased. But here was a problem. It was reasonable to assume that when a substance is dissolved in water, it splits into separate inno. Of course, in the case of non-electrolytis such as sugar, the freezing point was reduced to the right amount. However, when dissolving an electrolysis Normal salt (ClNa), the decrease of the frozen point was expected twice. The number of current particles was twice the number of salt inu. If the bethane ciorido (Cl2Ba) was dissolved, the number of current particles was three times the number of Sudam-Kalorid Ano consists of two atoms, and three by Borak Kalorid's inno. Thus, Arhinios thought that by dissolving some of the inns in solvents like water, they were rotten in separate atoms. Also, since such innos, once an electric present (in not sugar like anano, which is not to be singer), Arhanarios suggested that the innos did not break into normal nuclear (or inifferent authority), but by taking an electrical charge in nuclear. Arhinios suggested that faraday's inns were only atom (or group of atoms) taking positive or negative electrical charge. The ions were either an electric atom or an electric atom. (The last alternative was later proved correct. Arhinios used his ion-view of the account for several electrochemistry operations. Arhinios's thought was proposed in his docthesis 1884, conflict with considerable resistance; This thesis was about rejecting. But Ostwald, impressed, arhenius presented a position and encouraged him to continue working in physical chemistry. In 1889, Arhenyos made another useful suggestion. He said that ano, when collided, did not have to react, until he hit a certain minimum energy, with a dynamic energy. When this is low in the current energy, the reaction occurs quickly and easily. Instead, a high growth temperature will keep at low speed. But if the temperature in the latter case is too high that a certain number of innos received the necessary energy, the reaction will suddenly and rapidly move forward, with explosive violence occasionally. An example of hydrogen and a mixture of oxygen blasting when air temperature is reached. Ostwald used this concept to expand his theory of robotcorets, the cetlysis. It warned that the composition of the intermediate compound from Utparivarti required a lower sympromergy than the direct configuration of the final product. 5. A complete new revision in the properties of more and more gasses during the establishment of physical chemistry in the late 19th century. Three centuries ago, Boyle suggested the law, its name, which contains the pressure and volume of a certain amount of gas inversely (thus After which the temperature was shown, the temperature remains constant). However, it was seen that this law was not entirely true. Franco-German chemist Henry Reaganolt Victor (1810-78) demonstrated carefully the skin and pressure of gas in the mid-19th century, and it appeared that, especially after increasing pressure or reducing temperature, the gasses did not exactly follow the laws of the boiler. Around the same time, Scott physics james Clerk Maxwell (1831-79) and Australian physicist Ludwig Boltzmanan (1844 – 1906) had analyzed the behavior of the gasses, undertheunderstanding that these were random sets of thousandparticles (the natural principles of gas). They were able to achieve the boiler law on the basis of this, making two more assumptions: 1, that there was no force of attention between the gas inno, and 2, that the gas inno sized equal to zero. The gas that fulfils these conditions is called perfect gas. Neither assumption is entirely correct. There are small attractions between a gas inn, and when these inno are too small, their size is not equal to zero. Therefore, there is no real gas perfect, although hydrogen and new discover hem were almost perfect. Taking these facts into account, the Dutch physicist developed dadarach van de rewaal (1837-1923) has an equation of 1873 that is related to pressure, volume and gas temperature. This equation includes two constants, a and b (different for each gas), whose presence took into account the size of the focus between them and the inns between them. Better understanding of the properties of gas helped solve the problem of these liqifaangs. As far as 1799, the ammonia gas was lactated, it was cooled under pressure. (Pressure is the nourishing temperature at which the gas is classified, making the process much easier.) Faraday was especially active in this field of research, and by 1845, was able to thaw a large number of gas including the color and the slufer di-axis. By isaging the pressure of the lycoified gas that is targeted, it soon starts evaporate. However, the wanpikaran process absorbs heat, and the temperature of the remaining liquid swells dramatically. Under these conditions, liquid carbon di-allied solid carbon diaeoside has a gym. Solid carbon diaxide mixing with ether, organized to get faraday temperature. But there were gasses like oxygen, nitrogen, hydrogen, carbon mono-acid and mathen, which resisted their most unheartened efforts. As much as he took pressure on the experiments, Faraday could not find them together. These materials are called constant gasses. 1860s-69s, in Irish Chemistry Andrew's (1813-85) was working with carbon diacid which was simply scarily-sullied. After increasing the temperature slowly, he said how to keep carbon di-allied in the state of the liquid should increase the pressure. He felt that there was not enough to increase any pressure in the temperature of 31oC. At this temperature the liquid and gas stages seemed to mix, so speaking, and were indistinguish. Andreuse therefore suggested (in 1869) that each gas could not have a significant temperature above which there was no increase in pressure. They concluded that the constant gasses were only lower than those whose main temperatures had reached the laboratory. Meanwhile, Joal and Thompson (see 152-153), in their studies on heat, discovered that the gas can be cooled by expanding them. Therefore, by a gas extension, then it is not allowed to recover lost heat due to that conditions that shrink, expand it again, and thus once again, can reach very low temperatures. Once the critical gas has reached temperatures below temperature, the pressure request will be laquifa to it. Using this technology, French physics louis paul kaallett (1832-1913) and Russian-chemical raoul paktit (1846 – 1929) were organized in 1877 in monoxid gas such as oxygen, nitrogen and carbon salina. However, hydrogen has failed its efforts. As a result of Van dare Waal's work, it was clear that in the case of hydrogen, the Joel-Thompson effect would only work under a certain temperature. Therefore, it had to be low in temperature to expand and start cycling down. In the 1890s-99s, Scottish chemist James Dewar (1842-1923) started working on the problem. He produced liquid oxygen in quantities and stored it in the Dewar bottle. This device has a double glass of walls with a gap between them. Vacuum does not transfer heat by transmission or convention, as both phenomena need the presence of cases. Heat is only moved through space by relatively slow radiation procedures. Walls are by Salwarang so that the heat is reflected and not absorbed, Dewar organizes the radiation process to slow down even further. (Homemade thermos are just bottles equipped with a stopper.) Stored in such bottles, liquid oxygen is stored by cooling at very low temperatures by the immersion and then using the Joal-Thompson effect, in the battle of liquid hydrogen production 1898. Hydrogen was lqviified on 20oK, only one temperature is more than absolute zero [24]. But it's not yet, the view Less. In the same decade, static gas was discovered, and one of them, helyme, was low-temperature lycoified. Dutch physics Ilyaky Kamerlanga Onnes (1853-1926) was the last hurdle when, in 1908, heleme first cooled down in liquid hydrogen bath, then applying the influence of The Thompson Heleme and acquiring the liquid chemistrycontanant at 4K temperature. Chapter 10 Organic Composition Colorings: 1.2. Medicine 3. Protein 4. Explosives 5. Polymers1. When the ranginas started to bind organic inno with each other to men in the first half of the 19th century, they were increasingly increasing the boundaries of their science accepted. Instead of limiting their research in the current physical environment, they were starting to sione the creativity of nature, and it was just a matter of time. In a way, The Work of Brithlot with some of its synthetic fats marked a beginning in this regard but is being too much. The incomplete understanding of molecular structure confused the organic chemistry of the 19th century, but the development of science was so unusual that its lack had changed out to be an advantage. At that time (1840s) there were some known organic chemistry in the UK, and August Willham-vone (1818-92), who worked under the direction of Labbig, was imported from Germany to London. As an assistant he was assigned, a few years later, to a very young student, William Henry Perqin (1838 – 1907). One day, in the presence of Perkin, The Hofmann specuated synthesizing canon, loudly about the possibility of precious antamalarall. Hofmann had researched the coal-based products (the thickness of black liquid sown by heating coal in the absence of air), and wondered if it would be possible to synthesise the well from a coal product to the aniline like this. Its composition, if it can be done, will be a great success. The remote for supply of the cane will be free from its dependence on the adhesion. Perqin, completely, he went home (where he had a small lab on his own) to work. If he or Hofmann were better aware of the structure of the Canon Inu, then they know that this task was impossible for its mid-19th century techniques. Fortunately, Perqin ignored it, even though they failed, it probably achieved something more important. During the Easter holidays of 1856, he had treated aniline with potassium dichromate and as a result it was about rejecting the mixture as if it was a new failure, when his eyes reflected the purple in it. Add Some of its preparation dissolved and achieved a beautiful purple color. He had a die before that. He left school and used some family money to set up a workshop. After six months, he got what he called aniline purple. The French dry cleaner commended the new die and called the color evil. Very popular came to be such a color, known as this period of history the Kasani decade. Perqin, based on the vast artificial die industry, was able to retire, in full simpat, at the age of 35. After perqin's original work, Not long, Kebiotic and their structural formulaprovided organic chemistry with a map of the area, so to speak. Using this map, they can configure logical response plans, the appropriate ways to change a structural formula step by step to change an inno in one another. It has been possible to synthesise new chemical organic matter, not by accident, such as perqin victory, but deliberately. Often, after their son's deed, the reaction was called. For example, a method to add two carbon atoms to an inno, discovered by Perqin, called the response of perqin; another way of breaking a sinuis is discovered by the nitrogen atom, are searched by the owner of Perqin, called the name. His young disciple had inaugurated that he worked on the new field of organic composition chemistry, and there he said. 1864 He helped that what, after world war I, had a German capital in particular. Double in the natural color lab. In 1867, Bayyar (the theory of tension) started a research program that led to indgo's composition. This long-term victory was to displace the west's vast indgo plantations away from the market. A student disciple of 1868 Bayyar, Carl Graeby (1841-1927), synalizaran, another important natural die. All these achievements were founded on the art and techniques of applied chemistry, in which in recent decades our lives have been impacted in this way and continues to grow in its foundation and range. An infinite series of new techniques is developed to change organic inno, and to check the most important ones we need to do a little bit undirectly from the mainstream of chemical theory. So far our story is a direct narrative and a clear course of development to loan, but in this chapter and next we will have to talk about some individual development whose poor mutual relations come to light immediately. All This advance creates human needs chemistry applications, this is essential for our short history of science, although it seems they are separated from the mainstream. In the last three chapters, we will go back to the clear line of ideological development. The natural compound of increasing complexity was handled after the drug Perqin. Of course, synthetic substances cannot compete economically with natural products, except in relatively rare cases such as indgo. But the recipe is usually serviced to establish the structure of pollution, and it is something that is always a great ideological (and sometimes practical) interest. Let us look at some examples. German chemist Richard Willstátter (1872-1942) carefully establishes the structure of the chlorophyll, absorbs the ultraic light of the plant and makes it possible to use solar energy in the production of carbohydrates from carbon diacid. Two German chemists, Heinrich Oto-Valand (1877 – 1957) and Adolf Aus (1876 – 1959), spheervadas and extracted compounds were determined. (Steroids include many important hormones.) Another German camia, Oto Wallach (1847 – 1931), very thin teerpanas structure, a well-known sample of important vegetable oil (which has a moonish), a quarterly, hans fisher (1881-1945), determining the structure of the hem, the case of blood coloring. Vitamins, hormones, alkaloids, all of them have been investigated in the nineteenth century, and in many cases molecular structures were determined. For example, in the 1930s, Swiss chemist Paul Karraar (1889-1971) established the structure of Karotinados, as well as the main plant close to vitamin A. English chemist Robert Gibson (1886-1975) was organizedly dedicated to alkaloids. Their biggest success was finding the structure of the marphin (except an atom, which was suspicious) in 1925, and the structure of The Stracini in 1946. The work of The Rabinson was later confirmed by American chemist Robert Barnes Woodword (1917 – 1979), a limited stracanni in 1954. Woodword began to make breakthroughs in the composition of the time when he and his American colleague William v. V. Egars Doering N. 1917) took over the queen in 1944. This is a house that has such wonderful results for the ungodly search. Then in the same year, the synthesise including cholesterol (the most common of steroids) included more complex organic inno, and cortisone in 1951 (a reloaded steroid hormone). In 1956 he once again felt pine, first tremable, and in 1960's chlorophyll. 1962 A complex compound in The Woodword syncin Known antibiotics along with apromacan. Working in another direction, the Russian American-American-like kimaya was deriving the smell of The Phadia Aaron (1869-1940) the structure of The Noclyutades, which has been used as brick for the construction of the giant inno which are the nilax acids. (Niclic acid is now known to control the chemical activity of the body.) Its results were fully confirmed by the work of Scott Camia Alexander Robertos Tad (b. 1907), who in the 1940s and early 1950s, has various noclyutadis, as well as derivative compounds. Some of these substances, especially alkaloids, are characteristics of drugs, and therefore are grouped under the general title of the medication. In the early nineteenth century it was shown that completely synthetic products could be used like this, and were actually shown as worthwhile medicines. The synthetic substance was used in Arispannamana as a treatment agent against the 1909 German baktavlogast (1854-1915) by Paul Ahrlaqa. It is understood that this application has laid the foundation for the study of the chymotherapy, treating diseases using specific chemicals. In 1908 a new compound named Salfanalamadi was taken over, which was added to the large number of synthetic products known as but lacked specific use. In 1932, by research from German Camia Gherard (1895-1964), it was discovered that salfanilamadis and some of the obtaining compounds could be used to combat various infectious diseases. But in this case, natural products reached and pass the synthetic products. The first example was The Panisselon, whose existence was discovered in 1928 by Scott Baktaravlogast Alexander Fleming (1881-1955). Fleming had left the culture of exposed stophelock bacteria for a few days, after which he felt he had become hostile. An unexpected situation ignored them more closely. A clear area appeared around every spover of the fings in which the bacterial culture was dissolved. He investigated the matter until he could, doubting the presence of an anti-Menstruating substance, but difficulties in defeating its material. In a massive new approach to the problem as a result of the need for drugs due to infection during World War II. Under the direction of anglo-Australian methodist Shourd Walter Floury (1898-1968) and Anglo-German biocampia Ernest Borschain (1906 – 79), the panislin ingsed and its structure was determined. It was the first antibiotic (against life, in the micro-meaning of life, of course). By 1945, The Process Half a ton of product fini and detention was panislon per month. Chemistry learned in 1958 that to interfere with the formation of the fings in its middle stage, get the central center of the Panislin Inu, and then add it to several organic groups that will not naturally form. In some cases these synthetic products were superior features to those of the Panislin themselves. During the 1940s and 1950s, other antibiotics, such as streptomacane and teterasycin, were immediately isolated from different functions. The composition of organic premises could not be achieved from the analyst at any time without identifying the materials achieved at various stages of the composition process. Generally, the materials available for analysis were very low, so the analyzers were the best, and many times uncertain. The Australian Chemistry Fertz Pregl (1869-1930) reduced the size of the goods used in the success analysis. He achieved many health-related balances, designed fine pieces of glass, and was an effective microanalysis technology created by 1913. Analysis of small, by then unusual samples now became a very accurate process. Classical methods of analysis usually involve measuring the volume of a substance used in reaction (volumetric analysis), or the weight of a substance produced in reaction (the gr's metric analysis). As the 20th century progressed, physical methods of analysis were introduced that absorb light, change in electrical spherify, and other even more correction techniques. 3 Organic matter mentioned in the back of protein are made from the inu that exist as almost all simple units, that do not break easily with a soft chemical treatment and that contains no more than 50 nuclear, approx. But there are organic matter which are real teeth, with thousands and millions of nuclear. Such inno-nature is never a unitree, but are always formed with small brick. It is easy to break such giant inno in their constitution units to study them. He did this in the study of noclyutades, for example. It was natural to try to study the mainly maintained giant inno, and the first steps in the mid-19th century were taken in this regard. To do this first, Scott Camea Thomas Graham (1805-1866), thanks to his interest in spreading, this is that, there are two elements of matter that come in contact intermill. He started studying the speed of Gasses through small holes or thin tubes. By 1831 he was able to show that a gas spread rate was inversely proportional to the square root of his molecular weight (Graham Law). Then, Graham was able to study the conduction of dissolved substances and found that the solution of substances such as salt, sugar or salafist salafat was able to move a charipatar leaf (perhaps with a distribution hole). On the contrary, other dissolved materials like Arabic gum, poonch or jalatin did not cross the charampatra. It was clear that the giant innos of the last group of females could not be moved through the charampatra hole. Material sesame (and which can be easily accessed in crystal form) graham called them Crystallawadus. Those who could not, like Poonch (in Kolyvadas in Greek), called them. The study of the giant inu became an important part of the colloid chemistry study, which thus added to this kind of [25]. Suppose the charampatra is pure water in one side of the leaf, and on the other hand is a coludial solution. Water inno can easily enter the Coluadal Chamber, while the Coluadal inno-store block. Therefore, water comes out of it faster than inserts the coluadal portion of the system, and determines imbalanced osmotic pressure. Demonstrated in german bothaneston wilhelm fifer (1845-1920) 1877 It can be used to measures osmotic pressure, and by measures to determine the molecular weight of large innos in the coludial solution. It was the first properly good way to inject the size of the inno like this. An even better way to smell Of The Swiss Chemistry was made by Svedbarg (1884-1971), which produced ultra-central fuel in 1923. This appretis coluadal solution, enhanced by the effects of the giant ino-silos, the huge central fuel power. Based on the speed in which the giant ino displaced, molecular weight can be determined. Suydbarg's assistant, Arne Wilhelm ktaslavs (1902-71), also has better ways to separate the vast inns based on distribution of electricity charge at The Swiss, molecular level, one of the 1927. This technique, electroforce, was particularly important in protein separation and cleaning. Although methods provide data on the overall structure of the giant inu, the chemistry sparad to understand the chemical details of this structure. His interest was particularly focused on protein. While the naishastas and wood are making the giant inns as celluloes from a single The unit which is repeated inanely consists of twenty different but very similar units about protein ino. Different amino acids. For this reason, protein inu are very smooth and provide such a satisfied foundation for the sobletand diversity of life, although it is clearly that they are also very difficult for the properties. Emil Fisher, who had previously determined the detailed structure of chinese ino, started studying protein inno at the end of the century. This shows that part of the amino of an amino acid joined each other's immetry to make a hepatitis binding and experience it in 1907, thus effectively the due amino acids (it collects their eighteen) and appears to have some characteristic characteristic features of the resulting compound protein. However, amino determines the order of acids that make up the danaad chain in a protein inu because it happens in nature, another half century has to wait for the passage and discovery of a new technology. This technology began with russian bothansten-mikhayl semanobach tsvitt (1872-1919). He outed a mixture of colored plant through a tube of powdered aluminum acid. Different substances in the mixture are the request for the level of the particles of the smoke with different intensities. After washing the mixture, individual components were separated to the color band form. Tswett observed this effect in 1906 and called the loni-scripttechnique (color writing). Although Tswett published this article where initially went unheeded, in 1920s Willstátter and Richard Cohan (1900-67), a German Australian chemistry student reintroduced the technique. It was perfect in 1944 English chemistry venture John Porter Martin (born 1910) and Richard Lawrence Mallington Synge (born 1914), who used the smart filter paper instead of the wash column. The filter blends with paper and separate salinity; this technique is called paper loony description. In the late 1940s and early 1950s, various proteins were broken into their constitutional amino acids. Amino acid mixture was then isolated and analyzed in detail using paper loony scripts. Thus i had the total number of amino acids in protein inu, but not the correct command in which each of these is interference in The Danaad China. English chemistry Focused on the study of The Fredrek Sanger (b. 1918) insulin, a protein hormone divided between two tooth-connected chains about 50 amino acids. More I Broke The Inno And each of them separated the paper according to the loni script and studied. Although it took eight years to solve such a puzzle, in 1953 it got the order exactly according to amino acids in insulin inno. The same way has been used since 1953 to get detailed structure of even longer protein inno. The next step was to confirm that this resulted in a synchisizing protein by the inu, amino acids by amino acids. In 1954, American chemist Vincent du Vagniad (1901-78) broke ice by the synthesizing oketusan, a small protein inu containing only eight amino acids. Soon more complex bukharians reached, and dozens of amino acid chains were handled. In 1963, insulin itself was rebuilt in the amino acid chains laboratory. However, the amino acids in themselves do not even command protein, representing all useful knowledge about the molecular structure of proteins, gradually losing them from heat, often and permanently, to their natural state properties; Then he's called The Paulapipatadi. Conditions due to the dainad china are usually very light to break. Thus, the sterling should be attached with some structure weak secondary links. This secondary bonds are usually a hydrogen atom located between a nitrogen atom and an oxygen atom. Thus the power of a hydrogen bond is only twenty a part of a common xerif link. In the early 1950s, American chemistry lens Pavlong (b. 1901) suggested that The Danaad China was running in a conductive structure (such as the surplus ladder) that was held by hydrogen bonds. This concept was especially useful in relation to the relatively simple tantim protein made skin and pyondi tissue. But even the more complex karvi protein has become somewhat condiitable, as anglo-Australian chemist Max Ferdinand Perutz (b. 1914) and English chemist John Kovedri Kindaro (b. 1917) when they and Myogubin determine the detailed structure (after that) about when they are about it. In this analysis they used X-ray differentiation, a technique in which X-ray is passed through a crystal and is dispersed by its atom. The display in a given direction and angle is maximum when the atomic is arranged according to a regular model. The details of the batting make it possible to get the nuclear positions inside the ano. in the Complex sortangs, such as those present in a certain intensity protein inno, work is very careful, but I was located the last detail of the 1960 Meogulotbin Inu (containing 1200 nuclear). Pavlang also suggested that his condiit model can be used for nalyc acid. Anglo-New Zealand physics Marees himself Frederick Wilsons (b. 1916), in the early 1950s, targeted The Nalec Acid on X-ray differentiation, and his work was to examine The Suggestion of Pavlong. English physics Frances Harry Effect Compton Crock (b. 1916) and American chemist James Dewey Watson (b. 1928) found that further editing was needed to explain the diffraction results. Each nactix acid inu had to be a double helex, two chains coiled around a normal shift. This Watson-Crock model, pregnant in 1953, was in an important development to understand [26]. 4. Explosives Giant Anu did not even avoid chemical change hand. The first case was made famous by the discovery of a form of oxygen, which had already been made famous after an accidental discovery of German Swiss-Camea Christian Friedrich Schónbein (1799-1868). Having an experiment at home in 1845, he shed a mixture of nirick and sandacid and used his wife's cotton folds to dry it. They hung the folds to dry on the fireplace, but once it dried and disappeared. He had converted the folded cellulouse into a natochellousi. The nitrick-amil group (from nitrick acid) worked as an internal source of oxygen, and celluoleos, when heated, was completely a quick oadatid. Understand the possibilities of the Schónbein compound. The common black gunpowder exploded a hetty-smoke, weapons, dartiang canon and small arms, and the battle of the war. The nater-o-louse made the jinns possible flame gunpowder, and because of its ability as a propylant in the artillery gollite it was called ammo cotton. Initial attempts to make the landmine stake for military purposes failed, reducing the risk of explosion in factories. It was not until 1891 that War and English chemist Friedrich Augustus Habil (1827-1902) were able to develop a safe blend. Because the mixture can be pressed into long wire, it was called a kordati. And thanks to him and his divetits, the soldiers of the 20 century have enjoyed a diap observation camp while killing their enemies and being killed by them. One of the ingredients of Kordati is Natroglysaoran, discovered in Italian chemistry by Ascanio Suberro 1847 It was a very powerful explosive material which was too critical for war. Their use in peace was also dangerous to open roads through mountains and move tons of land for various purposes. And if the use of the inimitable was used , the death rate was also high . The family of Alfred Bernamajed (1833-96), a Sweddh, was busy preparing for Natrueglysarahan. At one point, an explosion killed one of his brothers, Noble decided to dedume all his efforts to shading explosives. In 1866 he found that a famous land called kieselguhr was able to sponge large amounts of natrueglyceran. Wet kieselguhr can be absolutely swayed in safe handling bars, but they retained the explosive power of the natoglyceran themselves. Nobel was named as a diamat security explosive. Working on their human spirit, they thought with satisfaction that the war would be so terrible now that there would not be peace to choose. The intention was good, but his assessment of human intelligence sined as hope. The invention of new and improved explosives towards the end of the 19th century was the first major part of chemistry for war since the invention of the mine five centuries ago; But in the development of poisonous gases in the second war, I made it clear that in future wars, humanity would corrupt science by applying it to the task of destruction. The invention of the aircraft and after that, atomic bombs made things clear too. Science, until the late 19th century seemed like a tool to produce a yuptopia on earth, was shown to many men as a mask of terrible fate. 5 Polymers but there were many other areas in which the peaceful use of the giant Anu-Phadumanatid. Fully-adapted celluolevs was definitely an explosive, but partly Naterada (Peruelan) allowed very safe handling to find applications important to it. American biologist John Weisley-Life (1837-1920), in an attempt to win the prize offered for anyone who got an ivory substitute for billid balls, started working with Peruelan. He dissolved in a mixture of wine and ether, and added kafour to make it safer and more smooth. By 1869 he had formed what he called Callulowad, and won the prize. Callulowad was the first synthetic plastic (i.e. a material that can be shaded). But if peruelan can be in the fields, then it can also be extruded in the reshs and movies. French-Made Luis Mary-Hallaari-Bernagood, Chardonnet number (1839-1924), get the reeds forced to problems of Peruelan through small holes. Is Salvant Almost immediately, leave a thread behind it. These themes could be made, giving a material that was silk yam. In 1884, Chardonnet nominated his Own Rhean (by his name because he was so bright that he was burning the light's ears). Plastic in the form of a film came in its own favour, thanks to the interest of American-based malady George Eastman (1854-1932) in photography. He learned how to get his silver compound amolins with the gletin to dry it. This mixture was stable and did not need to be ready on the fly. In 1884 he changed the flat glass with the Callolowad film, which made things so easy that photography, by then distinguishing experts, could become a hobby available to anyone. Callulowad, though from explosives, was still attached to burning garbage and a constant fire hazard. Eastman started using low-jallinshell materials and found that when cellulows, instead of niteric-amal groups, were added to the actaty groups, the product was still plastic but not overly syllable. In 1924, Cellulows Was Introduced To The Acity Film, at a time when the material sinus of the flourishing film industry needs to reduce the risk of fire. But chemicals also did not solve for the giant anu that was already present in nature. Belgium-American chemist Leo Hadreak was investigating an alternative to missing Rogn at the time of Baekeland (1863-1944). For this purpose they tried to solve a symprosis, which resulted in, in addition to small molecular units to create a large inno. The small inu is a moonage (part one) and the final product is a palaemer (many parts). It should be said that the way the moneymakers come up with each other to make giant inno is no secret. To take a simple example, consider two Ethai Anu (C2H4). Structural formula If we imagine that a hydrogen atom walks from one another to another and a double bond becomes a simple bond, so that a new bond can be used to bind two inns, we will get a four carbon substance: thus a four-carbon inu still has a double bond. This can be done again with another Ethai inu, moving a hydrogen atom and opening a double bond to create a six-carbon ino with a double bond. Then the same process will lead to an eight carbon ino, then a ten carbon ino, and so on as almost an inno. Balikeland started with units of Moonomar with phenols and formo-al-dahadi and developed a palaemer for which he could not find No. Then such a difficult, salvant-resistant palaemer could be useful for their reasons after it occurred to him. It can be formed and strengthened in the form of an un-adjacent form of electricity, difficult, water resistant and salvant resistant, but easily matchable. In 1909 he announced the existence of bakilaty, first and still, in a way, one of the most useful among completely synthetic plastics, in a way, called. All artificial fibers are also taking their place in the world. The main American in this field was The Home Caothers (1896 – 1937). Julius Arthur's Land in the Union with Belgium-American Camia (1878 – 1936) he said that rubber-related polymer shaded, and he had some of the flexible features related to rubber [28]. The result was in 1932, one of the artificial robots, or now as they are called, Alstomaris. The Caothers continue to work with polymers. They allow some damanas and dacarboiaiax acid innos to be plymaremade, they developed long inno-based rashes that contain a combination of atomic like the papitaid bonds in silk proteins. These artificial reshis, once raised, we now configure called Naelan. Some late before the market introduced The Case Death, World War II broke again, and until after the conflict it was not that Naelan took the place of silk in almost all use, especially in the lingeree. First, the synthetic polymer was achieved by trial and error process, as little was known about the structure of the giant inu or the details of the necessary response. An important structure in polymer structure education, in which the maximum was unsurely eliminated, was german chemist Hermann Stodanger (1881-1965). Thanks to their work, some of the lack of synthetic polymers were understood. One of them came from the possibility that the monomers would join each other in a random way, so that the atomic groups in them were in different directions with China. It worked to weaken the final product by not permitting randomly managed molecular chains to pack properly. Chains can also branch out, making things even worse. German chemist Carl Zeglar (1898-1973) discovered in 1953 that using a specific resin (a natural plant palaemer) could bind aluminum, tytinium or platinum nuclear as it was as upprec. This process allowed for a more organized collection of monomen, eliminating the risks. Thanks for the similar work done by Italian chemist Glyo Natta The nuclear impact representation was organized in an organized manner with The

Palaemer China. In short, the art of polymerization came to the kind of complexity that can be practically produced on the request of plastics, films and reshis, fulfilling specific features in the process. Oil was an important source of basic organic matter needed to produce new synthetic products in too much quantity. This seal was already known in ancient times, but had to wait for the development of large amounts of techniques to extract its use to gain access to large underground deposits. Edwin L'Orantana Drake (1819 – 80), an American mover, was first an oil-skilled in 1859. In the century since Drake, oil, as everyone knows, has become the core element of our society: the most important source of organic matter, from aircraft and for domestic use and power for mobile devices for motorcycles and launmours. Coal, although we forget it in this period of internal recruit engine, is also a very high source of organic matter. Russian-Kyma Vladimir Nikolayevach Apitf (1867-1952), after the last century and at the beginning of the current century, began investigating the reaction of complex hydrogen in the color of oil and coal in high temperatures. German-Based Camera Friedrich Karl-Rudolf Bergius (1884-1949) used the results of the Apitf in 1912 with hydrogen practical methods for treating coal and heavy oil, with an approach to making petrol. But total Global Geo-global fuel stocks (coal and oil) are limited and, in many cases, irrepable. According to education, till now, total stops are expected for the day which is not considered too far. Although the 20th century is covered by this threat, it is reason to assume that this will affect the next century, especially as a result of rapid expansion of human castes and increased demand. Chapter 11 Non-Organic Chemistoractor: 1. New Metaling 2. Nitrogen and Fluoid 3. The border between organic and inorganic. New metalization was far from preventing non-organic chemistry if the 19th century, especially its second half, seems to be primarily a period of organic chemistry. We already mentioned photography as an important application of inorganic chemistry in the 19th century, but as far as its importance to the economy or society's well-being is concerned, it should be counted as a secondary role of the course. Another of them, Kim Those who are generally ignored, but despite which they matter, was a development in fire making techniques. In all history, humanity had lit fire by fwang objects, which had to be heated to burn with high temperatures, or by the bean-gymming which was just a quick release, which was achieved with the flant and iron. But over time started using chemicals that have been burned at low temperatures, which can be achieved with a little friction. In 1827, English-like mator John Wakar (1781 – 1859) formed the first practical match match. Although after a century and half it has improved a lot, the principle remains the same. Photography and The Force Match are just two examples of many practical advances being made in non-organic chemistry, which mentions only in a wide and detailed history, but there is no way to focus on this short work but broadly on topics. The most spectacular progress in the applied chemistry of the nineteenth century was the work on metals, which had steel, and continues, most important to our economy. Oil is the food and fuel of our society, but steel, in its various conditions, constitutes its extract. Although, as we have seen, the work of Steel was common 300 years ago, by the mid-19th century a technique was not developed to produce it economically and in large quantities required to meet the needs of modern society. The name stands here that is of Henry Bessemer (1813-1898). Basesamer, an English metaling, was trying to design an artillery shell that moved on to its axis during flight and moved at a valid possibility speed. To do this I need one for one, one, that is with the serpheral groves that are soured in the spirit of barrel from the mouth. Barrels were made especially strong from steel, which required high pressure to be encountered forcing the dominance against the surplus notes, thus a very fast rotation. Non-stratatom common guns, such as used in time, can be built with weak materials, and on the other hand was quite expensive on the steel. Thus, until some solution was invented, as under the basecamera canon was not very practical. Iron, as it was developed, was poured into carbon rich iron (used to melt from cookor or mineral coal). Cast iron was very difficult, but tough. Carbon can be removed with its effort, which contains sweet iron making, which was resistant, but somewhat soft. then he Carbon steel needed to be configured, which was difficult as difficult. Basecamer was looking for a way to get iron with the right amount of carbon to make steel, without going through the expensive sweet iron phase. To take away the excess carbon in cast iron, he passed a wind river through liquid metal. This air cooled and did not stabilize the metal, but, in contrast, the carbon collection increased the heat temperature with oxygen. Erifio is able to get the right time constraint, basecamera steel. In 1856 he was the sun of his superior furnace. First, trying to redo his work failed, because his method needs to be used a force free. It undertheught, things were like silk, steel was put down, and the age of iron finally routed the age of iron. (Later, more techniques than basecamera were introduced in the steel production process.) The stiffness and the charm of the steel have made it possible for the construction of modern sky-scrappers and suspension bridges; It was steel that ships were allowed to turn off armor and provided the galaxy artillery pieces, and it's steel on what trains run. Figure 19. Basecamera's Converter Revolution steel production. This model is on display in The Kittsburg; right, Henry Bessemer, creator of the basecamera process, but steel production was not a stop to the combination of carbon and iron. English metaling Robert Mithadhar € a (1858-1940) studied the features of steel because he added different quantities of metals. In addition to the manganese, Steel seemed to make hard, but said compared to a metallurgocadus that was tried before. From the moment Steel had a 12 by 100 manganese that it lost this tough role. It became 1, 000oC and the site in the water was more difficult than the normal steel. I have in my manganese steel 1882, which marks the beginning of types of steel - in 1930s. Although the most common steels have a certain element called metals in the other metal is made in addition to steel- Chromem, Mualbadanam, Vandam, Tongstan and Naubeom, acquire appropriate khot steel types for specific purposes. In 1919, American mamo-eelsaqab or heins (1857-1925) contanipatentstainless steel, chromem and out. In 1916 Japanese metallergic cotaaros honda (1870-1954) produced a mix of a more powerful magnet formation to the tongstan to contain the co-balt in the steel that saw the common steel competition. This discovery also paves the way for more powerful magnetic al-Laves. New metals came into use as well. For example, aluminium is maximum Iron to earth floor, and in fact it is the most common metal. However, it has always got into compound form. While known by minerals and has since been produced by it while the predeshanical times, aluminium was not recognized as metal until a unclean specimen Wöhler's sutras in 1827. It was in 1855, thanks to French chemist Henry Aitian Saint-Clear Deville (1818-81), that a proper method was prepared to make moderate amounts of more or less pure aluminum. But still it was much more expensive than the steel, so it was just used for the Capstone in the form of a zero to the son of Napoleon III or the crown of the Washington Monument. In 1886, however, young American chemist student Charles Martin Hall (1863-1914), his teacher's hearing says that anyone who discovered a cheap way of making aluminum will be rich and famous, decide to work. Working in his home lab, he discovered that aluminum could dissolve into a melted mineral called a xyoid creulate. Once the acid was in the solution, electrolysis produced aluminum itself. Simultaneously, in the same year, French metaling paul Louis Toussaint Harvan Leuatenant (1863-1914) developed the same method primarily for producing metal. Hall-Heroult's procedure made available such as low aluminium and it is most used, such as kitchen saxpapans. The maximum price of aluminium is in its slowness (one third of the steel weight). This makes the dicosity especially suitable for the aviation industry, which also has an intake of magnesium, an even lighter metal. In the 1930s, the methods were developed to extract magnesium from dissolved salt in the sea, providing us with a practically indefinitable source of this metal. (Do not mention the bromana and iodine-salt itself is still drained from water. The problem of increasing importance for the future is to extract drinking water from the sea.) Metals such as titanium are also a promise. Titanium is a common metal, of intermediate slowness between aluminum and steel, and if properly prepared, strong of metals, in connection with their weight, is a common metal. The janola is similar, but it is less surrounding and heavy. The outlook for the future of the titanium is especially bright in the super-sonic aircraft which is designed and built today. Even flying through most levels of the atmosphere, an airplane is frequently moved at speeds that are far from air to the sordid friction with sound experiences. Its external surface has to face high temperatures, and that is Because under these circumstances it maintains its strength compared to other metals. 2. Nitrogen and fluoid It is true that in the 19th century the environment surrounds us everywhere, there it exists as a factor, for most biology it is not useful in the form of compounds. But it happens that nitrogen is almost static and hardly responds to the composition of the mixture. Thus, despite the omunapresanka of air, soil is often poor in natratis (the most common type of nitrogen compound) and should be used in the form of animal fertilizer or chemical fertilizer. Natratis are also components of ammo, and are non-horizontally used in the establishment of the most modern explosives, such as natrochylyai and natroglyceran. Soil nitrate deposits are maintained thanks to the storm's activities. Combine the electrical bean area to make nitrogen and oxygen compounds from the air. These compounds dissolve in rain drop and are moved to the edge. On the other hand, certain types of bacteria use elemental nitrogen from the air to produce nitrogenous compounds. But for the increase in human needs for natratis, fertilizer and explosives, it became increasingly difficult to rely exclusively on natural sources. German-Kyma Fantz-Habar (1868-1934) methods of investigating the methods of the atmosphere to abate hydrogen to the amonia, after which can be easily converted into natrats. In 1908 Habar achieved its goal, using Sobadesting nitrogen and hydrogen high pressure and iron as an uppentus. During the First World War, the blockade of the British fleet cut off the supply of natural nitrate from Germany's Chile desert (the best natural source). But after that the german kania Karl Bosh (1874-1940) had succeeded in changing from laboratory experiments to an industrial operation, and by the middle of the war it was already manufacturing all the Natragonous compounds that Germany needed. The exact opposite was the case with Fluoid: because of its large activity, it exists only in the form of compound, thus trying to challenge it at this time to move the chemistry efforts to its free form. However, from the time of Lawasier, the chemists are convinced that the element exists. So much so, that New Lands and Mandileo are included in their distance tables (figures 13 and 16), though nobody saw it. Certainly, electrolysis separated fluoids from its various molecular compounds, but as soon as the gas was in the form of an element, the reaction with the substance closest to it, once again formed a part (Fluoid is the most active of all chemical elements.) There were many chemists after Dewey who addressed the issue in the 19th century. This success was saved for French chemist Ferdinand Friedrich Henry Moissan (1852-1907). Moissan decided that because platinam was one of the few substances that can resist fluodye, without repair costs, there was no solution except to prepare all display materials. What's more, it's cool 500C, to lower the great racuta of fluoride. In 1886 he passed an electrical current through a potassium fluophoreid solution in his platinam material, hadrovorich acid, and achieved the purpose. Finally, fluoid, a yellow yellow gas, was isolated. Although it was a great achievement, Moissan was also more famous for another victory that really didn't. Carbon and diamonds are both carbon forms, and it differs in how the carbon atoms in the diamond are very involved in it. It is a hope that if high pressure is used on coal, the atom may be squeezed in the diamond array. It was one of the many attempts to be made for making diamonds. Moissan has tried to get it to dissolve coal in coal and give as coal as iron crystallly. In 1893 it seemed to him that he had been a trempad. He achieved an authentic diamond piece about half a millimeter long as well as several small and unclean diamonds. However, it is possible that Moissan was a fraud victim, and some helpers will put the diamond in the iron. We now know based on ideological concerns, that in situations in which moissan operation was impossible to form diamonds. For example, an American mover, Edward Godrach Achaisaon (1856-1931), also tried to form diamond from more common forms of carbon. It failed, but in action, while the coal in the presence of soil in extreme heat, it got an extremely difficult substance called carborondum. It is salka carbyde (a salican and carbon compound) to be pulled out and configured to be an excellent scratch. Higher pressure swells were used to form diamonds than those available in the 19th century, along with high temperatures which would make it possible to change the position of the atom with reasonable ease. American physics persia William Bradgmann (1882-1961) has been spending half a century, since 1905, on a team design that is already able to get high pressure. Various elements and compounds were taken to the new form, which was organized into nuclear and inno unusual compact arrangements. For example, many people of ice were dismissed with different types of water and are more than the boiling point of water under normal pressure [9]. In 1955, Bracman's technique was to create true synthetic diamonds. With the arrival of the 320th century the border between organic and non-organic started to reveal a new area on the border between organic chemistry and organic chemistry. English chemistry Frederick Stenley-Kuppang (1863 – 1949) started research in 1899 containing the silican element organic compounds, which, along with oxygen, is the most common element in the earth's crystal. Over a period of 40 years they organized to synthesise a large number of more than one organic compound synomise one or more of these non-organic worlds. In fact, silcan and oxygen were possible to get unusually long chains set up by nuclear alternatives. This work can classify this rule purely inorganically, but the truth is that each salcan atom has four valanas, which is used to collect with only two oxygen. The other two can be linked to either of the different organic groups. From world war II, the importance of such organic non-organic salcanas such as lactinits, hydraulic salines, synthetic sires, water inkproducts, etc. Common organic compounds are made from carbon atoms that are linked to other carbon atoms that have other nuclear attached. Generally, most of them are other nuclear hydrogen atoms. so organic compounds can be described as hydrocarbon and divectos. However, the fluoid atom, which is almost as small as hydrogen atom, will fit anywhere. It was then expected that full family of full-time phiorocarbones and divants would be there. One of the first researchers of The Philvoro Organic Compounds was American chemist Thomas Maly, Jr. (1889-1944). In 1930 he developed a carbon atom with an ino that had two-color atom and two fluo-o-fluoid atoms attached. It is easily laqvified, so it can be easily used as a co-lint instead of other easily-liqifiable gas, such as ammonia and sulfer diaxoid. Unlike them, the odorless and unusual, and also completely unsatisfying. This home is currently used almost globally in refrigerators and air-conditioners. During World War II, fluoride and fluoranated compounds were used to work on uranium and atomic bombs. The lubricants that were not attacked by Fluoroblasts were needed and Fluoropaerbones was used for that purpose, as they had already suffered (this thing) for maximum attack by Fluophilicle. Fluorode creates a very strong link with carbon, and the fluorokarbon chains are high And more static than hydrocarbon chains. Flaorolarbon polymers are water-ink- sawant, salivant akhtarsak and electrical non-liquid matter. Tiflon, plastic fluorek arbon, started to be used as a painting in the 1960s, so no grease is needed to be filled in them. Non-organic complexity does not need all carbon atoms, in some cases. German chemist Alfred Stock (1876-1946) started studying hygiene (borber and hydrogen compounds) in 1909 and found unusually complex compounds, would have been in some ways to hydrocarbon, could be established. Since World War II, Borco rocket has been used unexpectedly as fuel additives to increase the atmosphere and upper air of outer space by ship. Also, Boska did because of ideological interest, because the first type of common formulas to explain its structure were insufficient to describe their structure. But all these achievements, though impressive and anganaously achieved, were, at the same time, essential for modern life, exotic in the most serious matters of 20th century chemistry. The pure scientist was used below the atom level, and to see that he found that we would go back to the basic development line of our story in the rest of the book. Chapter 12 Electronsonoment: 1. The C.E. Rays 2. Photoelectric effect 3. Radioactivity1. The Cithadu Rays when Leupapa and his disciple The Magnet first proposed the concept of atom he conceived it as the ultimate and indistinfitable particle case. Dalton, about 2000 years later, kept this opinion. It seemed necessary to assume, by definition, the atom had no internal structure. If the atom can be divided into small properties, they are not minor characteristics, then be the real atom? This concept of atom, during the 19th century, is a perfect defined gas of the structure and indimitable. When this theory finally fell, it was as a result of a line of experiments that did not mean chemical in nature. On the contrary, it happened through current reading of electricity. If a positive electrical charge is in one place, detention and another has a negative power charge, electrical capacity is established between the two. Under this electric capacity driving force, one electric current connected to another from one point of view, reducing this current to equal detention. In addition, some materials are more easily available than others. For example, metals are in the mucous, Even a small power capacity is enough to generate current through them. Materials such as glasses, cubes and salfers are non-condactavi or mucous, and huge electrical possibilities are needed to drive even the smallest of them. However, based on the capacity of enough electricity, any material, solid, liquid or gas can be produced by a strong current. Some liquids (for example, a salty solution, such as the one previously known by the printers, manage the electric route very easily. A bean also represents an electric current that almost immediately drives through air mail. The 19th century prompters found it appropriate to go one step further and tried to drive an electric current through space. For important results, a gap was allowed to be completed (if any) without significant interference from the matter. The efforts of Faraday directly through space failed to lack a perfect enough space. But I was achieved by 1855, a German glass sphanya, Heinrich Geissser (1814 – 79), by then a way of creating higher space than was achieved. They prepared glass containers, making them false. A friend of his, German physicist Julius Plcker (1801-68) used these Geissser tubes in his electrical experiments. He introduced two electrons to such tubes, established an electrical capacity between them, and saw that there were some current through the gap. The luminescent effects that are present within the tube, and these effects are particularly different depending on the type of pressure. If the gap was too much, Lumanesceanka disappeared, but tube glass was shading a green light around area. The English Physics William Kruokas (1832-1919) in 1875 a tube with more than one perfect space (a tube of The Kruokas), which made it easy to study the current passage of electricity through space. It seemed very clear that the current power started in The Kathdo and journeyed to ado, where it has collided with glass and produces lumanescenka. The Kanyukas displayed it by keeping a piece of metal in the tube, and it showed that the opposite side of the kathadu put a shadow on the glass. However, that at time physics was not detected that electricity could contain current, nor can they be sure that it was being done from Udo from The Haddo. Whatever it was, he would travel in the straight line (since he casts out the sharp shadows), so that without him. About their nature, they can talk about radiation. In fact, in 1876, German physicist Eugen (1850-1930) flow is called The Haddo-Canes. It seemed natural to assume that the chaddo rays could be a form of light, and be made of waves. Waves travel in a straight line, like light, and, thus, do not seem to be affected by gravity. On the other hand, it may also be emissions that the haddo-ears contain particles rapidly, which, so light or so fast (or move at once), were influenced by gravity or so invaluable. This problem was the source of considerable controversy for a few decades, the german physics drifted towards the passing concept and english physics towards the korposcoller. A way of making a decision between two alternatives will be to find out if the method is made by the action of a magnet. Particles can be magnetic, or they can take an electric charge, and in any case they were waves, compared to that they would not be much easier by a field. He had shown himself that this effect existed, and That's what The Kanyukas did independently. However, there was still a problem left. If the chaddo rays were made of charging particles, an electric field could end them, although this effect was not already detected. In 1897, Joseph John Thompson in English Physics (1856-1940), working with advanced vacuum tubes, finally organized to demonstrate the reflection of the cathado-cans in an electric field (see figure 20). This test was the final link in China, and since then it was to be recognized that The Cithadu Rays were a series of particles taking a negative power charge. The magnitude of a chaddo ray particle deviation in a given magnetic force field is set by its mass and the size of its electricity charge. Thompson also succeeded in measuring the ratio between mass and load, although it was not able to measure one type of particle. The smallest famous mass hydrogen atom was, and if the particles of cathado rays were considered to be of the same mass, they should take an electrical charge hundreds of times compared to a charge known to more than one (that of hydrogen ions). If, on the other hand, the particles of the cithadu rays had the same charge as the lowest load in the ions, then their mass should be only a small part of the atom. One of these two alternatives must be fulfilled, as should be set by Thompson of the massive load ratio. Figure 20. The Kithdo Ray tube allowed To measure the deviation of electronic bean in The Thompson Electric Fields Known intensity. Plates are approved between plates, in which the field separated electrons, with scale to keep their blow pores. Later prefer alternatives and assume that the Kithdo Ray particles were much smaller than any atom. This was the development experience by 1911 american physics Robert Andreus Mallacan (1868-1953), which could very accurately take at least one particle of electricity charge. If this charge was made by a Chado Ray particle, then only 1/1837 of its massive hydrogen would be. As a result, this first subatomic particle was discovered. From the time of Faraday's rules on electro-lysis, it was thought that electricity can be moved by particles. In 1891, Irish physics George Johnstony Stoney (1826 – 1911) had also suggested a name for the basic unit of electricity, be it a particle or not. He suggested the name Electronica. Now the electric atom, which the men had speculated over the years, was finally published in the form of a cithadu ray particle. These particles are called electrons, as stoney suggested, and JT Thompson is therefore considered to be the perkashi of the electron. The photoelectric effect was now determining whether there was no connection between the electrical and the atom. Electricity can be a particle of electricity, and the atom can be a particle of matter. And both may probably lack structure, to be essential particles, completely free from each other. But it was very clear that independence was total . Arhanyus, in the year 1880-89, proposed his view of the view of the region and the attitudes of ions underthevie that he was accused of atom or electrical. At that time, most chemists accepted the idea of immortals, but things were different now. Imagine an electrical lying bound for a single-screen atom. Then we will take a negative charge to form a clone atom, which is the cloud ion. If two electrons were joining a nuclear group consisting of a sulfer and oxygen atom, the result would be a double charge sulpout ion, and so on. It can easily explain all the negativecharged ions. But how to explain the positive charge? Sudam ion, for example, was a smedium atom that was taking positive charge. At that time, any positively charged particle that was seen as an electrical device, then it is a means to assume that atoms will tell that the positive charge would be generated by removing one or two electrons from the atom: electrons that existed as a part of the same atom! This revolutionary possibility was most evident, which led to the observation in 1888 by German physicist Heinrich Rudelof Hertz (1857-1894), during experiments in which he discovered radio waves. While sending an electric spark through more than one space from an electrolyte, Hertz found that when the ultraviolet light came into the chaddo, the spark more easily. This, together with other electrical phenomena due to the events of light on the metal, was later called the photoelectric effect. In 1902, German physicist Paalapp Edward Hastam Antóm Antón Adassa (1862 – 1947), had worked as an assistant at Hertz's laboratory in his early years, having shown that the photoelectric effect was developed by the emission of electrons by metal. Many metals that had exhibited photoelectric effects; All of them excluded electrons under the effects of light, even when there was no current or electricity charge of electricity in the area. As a result, it seemed appropriate to assume metal nuclear (and probably all nuclear) electrons. But in their normal condition nuclear power was not charged. If they have negatively charged electrons, they should include a positive charge. They believe that atoms can consist of both positive and negative particles and are equal in all aspects. However, this possibility seemed quite impossible, if so, why was it not that the atoms were charged positively? Were they always electrons and only electrons ? J.J. Thompson then suggested that the atom was a solid circle of material spherified, including electrons, such as pie mushrooms. The negative charge of electrons in the common atom is correctly neuteralyd the positive responsibility of the atom. The new electrons provide atom with a negative charge, while the loss of some of the generated electrons provide a positive charge. However, the concept of a positive-charging solid atom did not prevail. While the non-positive lying particles have remained unknown in the early decades of the 20th century, other types of such positive particles were discovered. In 1886, Goldsthen (who gave his name to the Kithdo Rays) has had some experiments with a hole in a tube with The Haddo in which he made vacuum. The Chaddo Rays was created in one direction towards Adodo, the other rays made their way through the Kithdo hole, and were fired in the opposite direction. As these new currents travel negatively in the opposite direction to charge from the kithdo-karons, they appear to contain the particles charged positive. This was confirmed as to how they were able to get into a magnetic field. In 1907, J.J. Thompson called him a positive ray. More electrons are differed from positive rays. All electrons had the same mass, but there were no positive particles of the ears, where there were massive gas sized that were present in vacuum tubes (in marks). Also, while electrons were only 1/1837 of light atoms at large, positive ray particles had the same mass as the atom. Even a little bit of positive ears is of a massive hydrogen atom. New Zealand physicist Ernest (1871-1937) finally decided to accept the fact that the positive charge unit was quite a different particle from the electrical, which was the negative charge unit. He said in 1914 it was suggested that the smallest particle of positive ears, which was the mass of hydrogen atom, would be accepted as the primary unit of positive charge. His thoughts confirmed his subsequent experiments on the atomic response, in which he often saw that he had achieved a particle with a hydrogen. In 1920, Rutherford called their primary positive particle proton. 3. Radioscreta was the discovery of the positively charged particles also reached through a completely different type of experiment. German physicist Wilhelm Conrad Rontjan (1845-1923) was interested in the capacity of the Chaddo-Karans because of the lumanescanka of certain chemicals. To observe the deadly light that was created, they wrapped their vacuum tubes in dark rooms and in a fine black ass. Working with this tube in 1895, he observed a flash of light that did not come from it. A sheet of paper covered with chemical was far away from the tube, which is ged. But it was only when the gkithdo rays were acting, and not at another time. Figure 21. The X-ray device used by Rontjan: (A) with high-quality propaganda kundli ; (B) wallpaper with platinam brutal, which reached by lightning when ged; (c) tube surrounded by a cylinder black astenomy; (d) the cethdo which excluded electrons. Right, Willalim Conrad Rontaganavantgan The result is that when the hadids of the cethdo rays were created with some form of radiation that was created with some form of radiation that could move through the glass of the tube and the astenosthat surround it, and collide with the surrounding material. Of course, i moved the chemical treatment paper to the next room so, it still had to be extrusionwhen the had to work the black-do rays, so that it was able to go through the radiation walls. Rontgen called this fast X-ray radiation, a name that was saved for that day. (X-ray was later determined to be the same nature as the waves of light, but very much the orawaan.) (See Number 21.) The world of physics was immediately interested in X-ray, and started using them with what is among them is French physicist Beclère (1852 – 1908). A feature of their own (responition) are interested in the ability of some chemicals to shine with light when in front of sunlight, questioned or not included X-rays in fluorocent brightness. In 1896, a photography film on black paper wrapped and put it in sunlight, with a crystal of a custom uranium compound on it. Glass was a fluorocent substance. And if the lights were just normal light, it would not move through black paper or affect the film. If x-ray is on it, he will go through the paper and pass the film through each other. It was observed that the film was on the go. But he discovered that glass was not exposed to light, so therefore the talaqi-it would just as unclear the photography film. In short, delete crystal high radiation at all times! Mary Skaladafska Curie (1867-1934), the first known scientific woman, called this trend Radioskriti. It determines that it was not the entire uranium compound, but specifically the uranium atom, which was radioactive. Whether the atom was in its element form, or part of the compound, it was radioactive. In 1898, he discovered that toryum, heavy metal, was also radioactive. The birth of The Adaam Curie, Polish, with the help of her husband, did her research out of French Pierre Curie, a warned physicist. The radiation eothesed by uranium and torium appear quite as complex in nature. When a sum of radiation was thus approved by a magnetic field, the part bit in one direction, the part soured in the opposite direction, and the part was inefficient. Rutherford took these three components from the alpha-rays of radiation, the beta rays and the rays of the gama, inter-se. Three first letters of greek alphabet. Because the gama was not made by the reserve magnetic field, it was decided that it was light-like radiation, such as X-rays, but also more oranges. Beta-Rays was lowered in the same sense and in the same proportion as the Kithdo rays; I set that these ears were made of fast-moving electrons. Individual electrons eoined by radioactive matter are designated as beta particles for this reason. Determining the nature of alpha-karans. Alpha Ray experiments on magnetic fields showed an anti-deviation from this of beta-krans. Thus, alpha-curns had to be charged positively. They were just a little bit de-selected, so they were a huge mass. Surely, it made that out that he was four times the mass of particles that Rutherford Had called The Protons. This weight ratio started to indicate that alpha rays can contain particles containing four protons. But in this case, every particle should have a positive charge equal to four protons; However, as discovered, its burden was equal to only two protons. Therefore, it should be assumed that alpha particle, in combination with four protons, includes two electrons. These electrons will affect two positive charges without practically any massive increase. For nearly thirty years, it was thought that this combination of protons and electrons would form alpha particles and other positively charged particles to similar combinations. However, problems acause in this cut. There were ideological reasons to doubt that alpha particles could be made up to six small particles. In 1932, during the experiments suggested by Rutherford, English physics James Chaduak (1891-1974) discovered an particle that had exactly the same mass as protons, but which had no electrical charge. Because it was electrically neutral , it was called a sadhela . The Warner Carl Hasanbarg (1901-76), a German physicist, immediately suggested that it was not a proton-electric collection that set up non-positive charged particles, but proton-sadila combinations. Alpha Particle, according to this proposal, will consist of two protons and two neutrons, with a total positive load of two, and a single proton total ingt four times. The physicist found that an alpha particle is made up of six subatomic particle particles that were beautifully appropriate for their theories. Since then, the structure of proton-sadila has been accepted. Chapter 13 No. No. 2. Electronics 3. Echo 4. Half Life 5. Isotopes1. Atomic number [talyom] uranium and torium production was quite weak, and it was difficult to work with them. This situation was no cure from Mme. Curie. In the investigation of the radioscrate of uranium minerals, they found some low uranium mineral samples, which were still highly radioactive, even more pure uranium. They have concluded that minerals should contain some radioactive except uranium. As I knew all the radioactive components that were in significant quantities, and as they were all known as non-unknown elements had to exist in very small quantities and as a result, be highly radioactive. During 1898, she and her husband tried to focus on radioscreta in huge quantities and separate the new element. In July this year he achieved his goal and called the new Polonom element which led to Mme. Curie. In December, a second element, radio, was located. Radius was highly radioactive, the insitous radiation 300,000 more time than those produced by the same uranium weight. Also, it was really weird. From the tin-suo-dion sion, only about 1/300 of the radio swere able to get the vince. Other strictly radioactive elements were discovered in small signs. In 1899, French camera Andre Luis Debierne (1874-1949) discovered the etanome. In 1900, German physics Friedrich Ernest Doran (1848-1916) discovered a radioactive gas, which was later called The Raco. It was one of the Nobel gasses and fit under the anon in the distance table. Finally, in 1917, german chemists Oto H (Max-1968) and Lmener (1878-1968) discovered the protocol. These are the most-still-radioactive elements that work as 'particle canons'. The lid radiation. If a portion of the material containing some of these elements is placed in a lead organized box with a hole, almost all the parliament thing is absorbed by the address lead, but some will pass through the hole and creates a thin flow of many dynamic particles that can be directed against the target. It was Rutherford who used such particle canon more effectively. It began in 1906, with metal bombing thin sheets (for example), fast alpha particles. Without being the most alpha particles affected, it passed me or passed the biatomy, being recorded on a photography plate placed behind them. But even at large angles, each were separated from the other. which serve as white like gold sheet A thickness of 2000 atoms, and since more and more alpha particles passed without colliding with anything, it gave the impression that atoms were mostly made of empty space. However, the fact that some alpha particles are very uncouth means that the atom has been very large anywhere, is charged positive to the positive of the mana-charged alpha particles. Rutherford then developed the nuclear core theory. He said that atom, at its center, is a very small institution, which is charged positively and contains all the protons (and has been discovered later, also neutrons). Atomic smaller particles have to be small, to correct small parts of alpha particles, but it also contains every mass of nuclear. The external ooteric areas of the atom are negatively charged electrons, which are very light to make alpha particles a major obstacle to the passage. Although the protons and alpha particles are largely in accordance with this of nuclear, they are actually plain nuclear navies. They have taken up such a small space than this atom that, despite their massive scale, they can also be considered as subatomic particle particles. Rutherford's nuclear atom is the question of the indawasabalaty of a more nuanced atom. The central center, which was the heart of the atom, was surrounded and preserved by a cloud of electrons. It remained faultless and unchanged despite all the chemical changes. It was suggested the idea of an indimitable atom that was evident between it due to all the test experiments before the year 1890-99. However, the atom had changed the normal chemical reaction. Electronic clouds remained high, but not all. Some electrons may be excluded or added from the atom level. Thus, the problem of ions, which had to return three generations of chemicals, was finally resolved. If accepted atomically, the next question is: How is atomically different from any element? From dalton's time, it was found that various nuclear differences were made on a large scale, but how does this difference appear in the particles of the subatomic particle to make the nuclear era? Initial indications of a possible answer came from the X-ray study. German physics max Felix won't be a lawa (1960-1960) started bombing X-ray crystals in 1909 These classical experiments have established two basic facts: the nuclear-containing crystal sans regularly ordered in a geometric structure of the tahs, and it Disperse x rays according to a fixed model. Depending on how X-ray are de-selected (or diffracted, Size (wavelength) that can be determined by the x-ray of small waves. Then English physics Charles Glower Barkla (1877-1944) discovered in 1911 that when X-ray are lowered by certain elements, they generate the bean that penetrates the case in the amount of feature. Each element feature results in a specific series of X-ray. English Physics, Henry Guin-Jiffrius Mosely 1887-1915) Used the method of the lawa to determine the wavelength of these feature X-ray. In 1913, they found that their wavelength slowly decreased the atomic weight of the elements that had excluded them. This incursion ratio, Mosely's argument, depended on the intensity of the positive charge present in the atom's share. High load, feature short wavelength of X-ray. In fact, by wavelength it was possible to calculate a given element's atom load. So, as it later appears, hydrogen had a nuclear charge + 1, heleme + 2, latime + 3, and so on until it reached uranium, with + 921. The intensity of nuclear charge is called nuclear number. It was first understood, when Mandeliyo had ordered his elements that he had been weighing atomic, he was actually ordered to them for their nuclear number. In a couple of situations where I had placed the most massive nuclear in front of the younger ones, they nevertheless had a big nuclear number, because we will soon talk that reasons. Finally, the operational definition of the 'element' concept of the boiler (such as a substance that did not ask to break into plain matter) can finally be changed by a structure definition. The definition of element, in the twentieth century, will be: one element is a substance that contains atoms that own all identical and feature atomic numbers. Also for the first time it was possible to predict how many elements were being discovered. All nuclear numbers from 1 to 92 were already captured by the known elements in 1913, except seven: nuclear numbers 43, 61, 72, 75, 85.87 and 91. The productanyum (atomic number 91) was discovered in 1917. 1923 The hafnome (atomic number 72) was discovered, and in 1925, Ranyum (Atomic No. 75). Then there were exactly four differences in the Meadadi table: nuclear numbers 43, 61, 85 and 87. It seemed that only four elements were being discovered. But the fact is that the difference remained well in the 1930s. Put Protons are only a positively charged particle, equal to the number of current protons in the nuclear number. Aluminum, with an atomic number of 13, must be 13 mainly protons. But since its atomic weight is 27, it should also be included (as later discovered) in 14 neutrons. Neutrons provide massive but do not load. Similarly, a stom atom with an atomic number of 11 and a nuclear weight of 23 must be 11 protons and a section of 12 neutrons (as are between the protons and neutrons, they are grouped under the name Noclineus). In its normal condition, the atom is electrically neutral. This means that everyone in protons must have an electric field in this area. As a result, the number of electrons in neutral atoms is equal to atomic number. A hydrogen atom consists of 1, a sodium atom consists of 11 electrons, a uranium atom 92 electrons, and so on [32]. Electronic devices when two atomic collisions and reactions are expressed, they are joined by sharing a certain number of electrons, or after one or more electrons have been transferred to another atom. What are the results in sharing or changes in electrons that have characteristics affecting chemical reactions in your content. The speciality came from a certain command about the appearance of such electronic changes from careful work with X-ray. Such works made it believed that atoms were present in groups within electrons that were described as electronic scars. We can think that the tiths are like an onion leaf capable of raw where each of the fins contains more than one electron slot. Was selected with letters of the columns K, L, M, N, etc. The Innithist-P, K, can consist of only two electrons, the fon I can attach to eight, and so on. This concept finally serve to define the distance table. For example, three electrons of the Lytium atom are ordered in electronic devices as well as in form 2.1; 11 electrons of sudam atom are organized in 2, 8, 1; nineteen electrons of potassium atom are available 2, 8, 8, 1; And so on. Each of alkaline metals is a way of its nuclear in such electrons that the Ootist electronic battery contains only one electrical. Since it is an external ootyrst electronic surface that comes in contact with the middle of the nuclear, it is expected that it is the number of electrons in the surface that determines the chemical activity of an element. Different elements with the most external electronic parts will be similar. Similar. That's why different alkaline metals have similar characteristics. Similarly, alkaline-tea elements (magnesium, calcium, storuntyum and bereme) are all the same, because each outdoor outer outer-bed has two electrons. The Halongs (fluoid, chorin, bromana and iodine) have seven electrons in their outer outer screen. While Noble Gasses (Nein, Argon, Corrupt and Anon) all own eight. In fact, Mandileo, in arranging their distance table, inadvertently placed elements in rows and columns in electronic tables according to their nuclear arrangement. As the number of electrons increases as atoms become heavily, a time comes when electronic devices start to overlap. There are constant atomic data atoms that include electrons in the inner most, while the number of electrons in the outer part is constant. This sequence is especially in the most of the most-unique earth elements, which include the atomic number of 57 to 71. When we increase the number of electrons in the inner-outer outer sands, we make progress in the table of the time, all the rare rafters maintain three electrons in the outer avoterist. His similarity to the outer most of the outer most explained why the elements of this group were similarly surprised in their characteristics. Mandileo had ordered his distance table based on the different elements, and not on their electronic arrangements, which were unknown to him. Thus, it seemed appropriate to assume that a factor of the sift was set by its electronic management. German-Based Kmaya Richard Abegg (1869-1910) pointed out, in 1904, this great gas had to be a particularly stable electronic setting. A great gas atom had no tendency to increase or reduce their number of electrons, and therefore were not involved in chemical reactions. It was the emission that the other atom could produce or accept electrons to get the order of Noble gasses. 1, 1, 1, 1, 1 is organized with 11 electrons of sudam, while seventeen electrons of the clone are 2, 8, 7. If sudam accepts an electrolysis and a clauren, the former gets to the neon order of 2.8, and the last argon order of 2, 8, 8. Naturally, sudam atom, which is negatively charged, is left with a positive charge and becomes sofam ion. By obtaining an electrolysis the clone atom, becomes a negative charge benefit, and the clone ion. The two unite with The Berzelius of electric attention amiddle allegations of different signs, as was previously suspected a century ago. From this, the following Sudam will have a sofa 1. You can't get more than one electronic one without a stable management of 2, 8. Nor can the more than one electron accept the clauren atom. On the other hand, calcium, 2, 8, 8, 2, with the arrangement, goes to produce two electrons, and oxygen, with one of 2.6 electrons. Naturally, both elements will have a sift of 2. This is electronic dasplymantus, by way, which is possible to focus the load in one place or another, so that chemical reactions can work as current sources of electricity, because The Vallata discovered a century ago. From an electronic perspective, equal weight was equal to the relative weight of the elements involved in an electronic migration of this type. Its equivalent weight is, after all, the atomic weight is divided by the zarf or, in other words, the atomic weight divided by the number of electrons transferred. However, Abegg's proposal is fully understood to transfer the electrical from one atom to another, which was held together by the resulting electrostateattraction. In that case we talk about electrovalanka. Two American chemists, Gulbrit Newton Lewis (1875-1946) and Longmere (1881-1957), independently propaganda the idea in the following years 1916. Among other things, they suggested a description for the structure of the clauren inu, in which two-clone atoms are attached together. Certainly, there is no reason to move another clauren atom for a single-clauren atom, and certainly cannot be kept together by the normal electric attraction. The idea of Bezelius and the abegg's theory failed at this point. Instead, Lewis Lagamvir's suggestion was that each atom could bring an electric device to a normal background. In the normal background two electrons will be in the outer ootist electronic battery of both atoms. Electronic arrangement in the clone inno can be described after: 2, 8.6, 11, 6, 8, 2, including both normal electrons in each atom's electronic total. Each atom will be such a sequence of 2, 8, by very little stable management instead of 2, 8, 7 of isolated-clauren atoms. For this reason, the clone ino is much more stable than free atom. To maintain all electrons in the ootyrst electronic spher, two atoms must remain in touch, and they need enough energy to separate. Each of the electrons provided for shared background represents a 1-page page from which it comes. This Polynesia, The action of two atoms in cooperation is a Kovalanka. Louis Longmir's theory was particularly relevant to organic compounds, because the bond between a carbon atom and another, or between carbon atoms and a hydrogen atom, was easily explained like this. As a result, most organic innos can be easily represented by electronic formulas, generally, the old status of Keterakata's formula was changed by a combined electronic pair. In fact, The English Chemist Nevil Vincent Sadguak (1873-1952) was able to enhance the concept of 1920s in the concept of Electronic Monday Kovalanka for non-organic compounds. In particular, they have put it on The Varner's harmony compounds in which it was difficult to represent generally. In all these chemical changes only electrons were transferred. The protons (all but in one case) are fully secure in the main core. The unusual case is hydrogen, which is set up by a single proton. If the hydrogen atom is only afraid of its electrical damage, then proton is [33]. In 1923, Danish chemist Johannes Nicholas Braunsted (Hines - 1947) introduced a new approach on acids and adhesives. An acid was described as a compound which was to get a proton (or hydrogen ion), while a base was suffering from being in combination with a proton. This new approach was evaluated by the old theory that explained all the facts. But it has also provided more flexibility than that which made it possible to expand fields based on acid where the old rule was wrong. The buzz was relatively easy to read the rapid ion response of small inno and inorganic chemistry. Chemistry, since the time of The Lawasier, can predict such reaction courses and how to modify them according to specific requirements. Complex inu and organic chemistry was very difficult to analyze the slow response. There were several ways in which two substances could react; one was the desired route to guide the response suo-mail edit edited by some knowledgeless art and indigenitable. However, electronic atoms have offered organic chemistry a new perspective of their own field. In the late 1920s, male-like English chemist Christopher Ingold (b. 1893) was trying to interpret organic responses in terms of migration of electrons from a point inside an inno. He started Accelerating the physical chemistry methods, in an attempt to interpret the instructions and trends of such dasplymants. Physical organic chemistry became an important discipline. The effort to interpret organic responses in terms of moving small, difficult electrons and moving forward was inadequate, however, but this situation was not long. During the first quarter of a century after the discovery of the electric, it was assumed that the particle was a solid, small circle. But in 1923, Louis Victor, prince of the off-branch, a French physics (1892-1987), provided ideological reasons to consider that electrons (as well as all other particles) have characteristics of a wave. By the end of 1920, the theory was confirmed by the permantal. Palong, first of all, is the suggest of the condiit structure protein and nactex acid, which has developed in early 1930 methods that allow the repul nature of electrons to take to account when considering organic responses. This shows that the combined electrons of Louis Longmere can be interpreted as a wave conversation. The electronic waves strengthen ingested, with each other buzzing to separate more stable situations with each other. This theory of resonance was particularly useful in establishing the structure of Benzene, which had been a cause for surprise and had already continued to have dubious points. As is commonly described, the benzene structure is a hexagon with single and double turn links. According to The System of Louis Longmere, two and four combined electrons are grouped with alternatives. However, benzene almost entirely lacked the characteristic characteristics of other compounds containing dual bonds (four common electrons). Palong shows that if electrons are considered as a repal form, individual electrons did not need to be reduced at the same time, but it may be reduced in sufficient space. In other words, electronic waves can occupy areas the billid ball will occupy small electrical. Anu was quite flat and sadol when such I was highlighting the tendency to weaken. Benzene is a no-flat and sadol, and Pavlang demonstrated that the electrons were so bound by the same way six carbon atoms were benzene ingoti. Links that join them may not be represented as a single links or double links, but as a type Especially the stable, or intimitable resonance, between the two extremes. Other places other than the structure of benzene were explained by the idea of resonance. For example, the four electrons in the ootyrst part of carbon atoms are not all equal from the point of view of their energy characteristics. It can then be assumed that a slightly different type of bond would form between the carbon atom and its neighbor, depending on whether carbon electrons were involved. Nevertheless, it can be shown that four electrons, as a triple form, interacted with each other and established four average bonds that were exactly equal, and one directed to the peaks of Teteradraon. Thus, the atomic of the atom of The Tethadrereal (see 125-26) was explained in electronic terms. The buzz also helped explain a group of exotic compounds that the chemistry had encountered in the early 20th century. In 1900, Russian American chemist Musa Gombarg (1866 – 1947) was trying to develop Heapaulini, a compound with an ino consisting of two carbon atoms, with six banzac circles (three to one carbon atom) attached. Instead, it got a color solution of a very reacting compound. For many reasons, he had achieved a symamolycoli tarunelmethel containing a carbon atom with three bamboo rings attached to it that was forced to exit. The fourth link of carbon atoms was empty. This compound, which recalled one of the ancient radicals issued by an inu, is called the general free radical. Using the electronic concept of atom it was suggested that there is an unpaired electronic such as a free radical tarunelmetahel where ke's old concept will be kept unused link. Normally such uneven electrical power is very unstable. However, when the inno is flat and very sisod, as is the case with The Tafanilmetaheil, the unused electrical may be spread in the inno. It is a stable independent radical. When studying organic responses in electronic terms, it was clear that there were generally stages in which to create a free radical. Such free particles, not normally stable by resonance, could only be high and were set with just difficulty. This difficulty in the formation of intermediate free particles had made the most organic reaction so slow. In the second quarter of the 20th century, organic chemistry started to achieve a fairly deep erased view of these different measures that made the response In other words, the response mechanism. This approach has been, more than anything, it has directed contemporary organic chemistry in their composition work, and whose complexity is due to the building of the inu overcoming previous generations. But the buzz ingestions were not limited to organic chemistry. There are boron innows that cannot be represented from other perspectives of the assessment. Zarf did not occupy enough unnecessary bonds (electrons) for this purpose. However, by the decantalijiang electrons, the waveforms can be suggested as accurately, a proper pollution structure. The suggested link in Pavlang may not be resistant to establishing the link as 1932 that was assumed during the third century after a great gas atom discovered it. At enough pressure and with an extremely reactable atom like fluoradied atom, they can form compounds. The proposal of Pavlong was not first heard, but was achieved by the reaction to Nobel Gas with fluoid in 1962 Anon Fluoid. Soon after, various anon compounds were set up with fluoids and oxygen, as well as one or two reberand crepataons. 4. Half life while studying internal atomic structure suo-fait hon. In 1900, Kruukas discovered that the fresh-made pure uranium compounds were only weakly radioactive, but their radioscline had become stronger over time. In 1902, Rutherford and his assistant, English chemist Frederick Savdy (1877 – 1956), suggested that when a uranium atom routed an alpha particle, its nature changed. It became a new type of atom, with different radioactive properties, uranium itself produced stronger radiation than theirs (thus adjusting the observation of the kruukas). This second atom is rotten, with a third type of atom formed. In fact, uranium atom was the father of a complete series of radioactive elements, a radioactive series, which included radios and polonium, and finally ended in leadership, which was not radioactive. For this reason, radius, polonium and other rare radioactive elements are given in uranium-chinge. Uranium also starts with a second radioactive series and a third with torium. According to the definition of the element's boiler, uranium led by this transmoitaon needs to understand that uranium is not a factor but not because of the new definition of atomic number. After all, since the elements are not really indimitable particles, they don't even have to be completely resuinated. (This is the A higher level on a return-in old alchemical concept.). It is amazing how, if the radioactive elements are constantly transmotang, then one can still exist. It was Rutherford who, in 1904, solved this problem. While studying the rate of radioactive vantilysion, it appears that, after a certain period, for each element, different, half of any amount of a specific radioactive element is left. This period, characteristic for every type of radioactive substance, said it is Rutherford Half Life. (See figure 22.) Chitra 22. The half life of the reber is set by measuring the amount of left material after the equal time interval. Representation is asympatatok, and radius half life, for example, is only under 1600 years. After several geological periods there will be no radio left in the earth's crystal, if new deposits are established through continuous uranium distribution. Similarly, other uranium is true for transmoutaon products, whose half life is in some cases only fractional to each other. For uranium itself, it is half a life of 4,500,000,000 years. It's a great period of time, and in earth history only a part of the original uranium reserve has had the opportunity to dasantgartang. Toryum merges more slowly than disintegrates, having half its life 14,000,000,000 years. Such time extensions can be set by counting the number of alpha particles produced by a di Mas of uranium (or toryum), which Rutherford observed when colliding with a zinc-sulphard screen (in which a glow counter is formed). Each alpha particle released the meaning of a left uranium atom, so Rutherford was able to determine how many atoms were left per second. The large scale of uranium they were managing, they were nuclear in total number of extracts. With this information he was able to easily calculate how long it would take for half of uranium nuclear to get the suo-suo-trem, and it became billions of years in order. So the continuous and feature is the slow and spectacular distribution of uranium, which can be used to measure the age of the earth. In 1907, American chemistry to The Bertrom Bordein (1870-1927) suggested that uranium mineral-led material sedate could work as a guide in this regard. If all led uranium should be generated from the vantiation, it would be easy to calculate how much time could be wasted in its lead amount. It was counted such that the solid earth's crystal must exist for at least 4,000,000,000 years. Meanwhile, Saavedi mentioned the atomic particle particles when an atom changes. If an atom lost an alpha particle then with a load of + 2, it has since decreased by two. Atom was shifted to two positions on the left side in the Mediatable. If an atom lost a beta particle (an electric one with the charge of 1), the organization took an additional positive charge [34], and a position on the right side in the element high-level table when a person deleted a gama ray (without load), its energy content was changed but the number of particles did not change using these laws as a guide While doing, the chemists were able to get details of several radioactive series. We go but all of this created a serious problem. What to do with different uranium and torium vantilysion products? There were dozens of them, but most of the time there were nine sites in the table (from the polanium of atomic No.84 to the uranium of nuclear No. 92) where to keep them. For a specific example, let's say that uranium atoms (nuclear no. 92) have eothered an alpha particle and its atomic number which was left of the atom that became 90 because of it, according to the principle of saudiism. This means that the Toryum atom was set up. However, while uranium-produced torium had half a day's life, the normal toryum had half a life of 14,000,000,000 years. Savdi suggested this fearless suggestion that the same space on the distance table could be occupied by more than one type of atom. Place No. 90 can close different types of toryum, place number 82 different types of lead, and so on. They called the atomic types that occupied the same place as us, the Greek word means the same place. In a given space in the table we will have the same atomic number, and as a result, a number of protons and the same number of electrons in the area. One element we go will have the same chemical properties, depending on the number of electrons in nuclear and these characteristics of management. But how do you explain differences in radioactive properties and nuclear weight? Nuclear weight can represent the key to differences. 100 years ago, he suggested that all atoms were made of hydrogen so that all elements could get a complete nuclear weight. The fact is that the highest nuclear weight The whole had destroyed this son. But now atom was to be born from the protons in its new atomic appearance. The protons and neutrons have almost the same mass, and therefore all the atoms that must be weighted are the numerical attachments of hydrogen weight (the configuration of a proton). Prout was restored, and instead new doubts were presented about nuclear weight. In 1912, J.J. Thompson (Electronic Perkashi) had targeted the negatively charged Nine-Ion for a magnetic field action. The field made the Nein ions turn towards it and made them impact on a photography plate. If all the ions were the same mass, then they were all to the same extent it was to be side-facing, and the same stain would be published on the film. However, two places were located, ten times deeper than each other. One of these assistants, Francis William Aston (1877-1945), later improved the mechanism and confirmed the results, which were similar to other elements. Because this method has chemically ions like a kind of black space spectrum, it was called a massive spectrum. The intensity of a magnetic field against a similar charge depends on the mass of the ion; Its older it is, less so than it is. The results achieved by Thompson and Aston were to indicate that there were two types of nein atom, one more massive than the other. One of them was a 20-year-ago musician number and the other was 22. As was ten times more than the Nine-20 Niin-22, the decision by the relative darkness of the places (there were also very few intake of nein in recent years-21) seemed appropriate that the nein's nuclear weight was about 20.2. In other words, individuals were unexpectedly people who were a number of hydrogen atoms [35], but a given element, being made up of different people's nuclear, is a nuclear weight that will average their weight, and as a result it did not have to be a molecular number. The average weight of a given atom we go to may be higher, in some cases, than the average weight of an atom with a high nuclear number. For example, with a nuclear number of the talynoyum 52, seven we have to go. Of these, the two most massive we go, The Talyuryum 126 and The Taloweryum 128, are the highest. Therefore, the atomic weight of The Taloro gets 127.6. Iodine is immediately the highest nuclear number, 53, but is set by Iodine-127 only, and therefore its nuclear weight is 127. When Mandeliyo put iodine after Telloro on his board Changing the order according to atomic weight, instead, was being inadvertently done by atomic number. And that was the right way to do it. Let us look at another example. Potasshim (Atomic No. 19) consists of three we go, Potasshim-39, Potasshim-40 and Potasshim-41, but the lamps we go, Potasshim-39, is by far the highest. As a result, the atomic weight of potasshim is 39.1. Argon is a low nuclear number (18) and is also made up of three we go, Argon-36, Argon-38 and Argon-40. But in that case it's the most massive we go, Argon-40, that's the most around. Thus, argon's nuclear weight is about 40. When Ramame put argon before potasshim and then, nuclear weight, it was also directed by atomic number, and was also to work properly. The use of the massive spectrum measure allows atomic weight determination which actually measures the mass of each of us and the current amount of each of them, and then take the average. The accuracy of this method classified chemical methods for measuring nuclear weight. A given element is different than the same atomic number but different sex number. Different we will have the same number of protons in their new one, but different number of neutrons. Thus, the Niin-20, Nien-21 and Niin-22 all have 10 protons in them, so they have a nuclear number of 10, and electronic management of 2.8. However, the Nien-20 is an institution with 10 neutrons in addition to 10 protons; Nein-21, one with 11 neutrons in addition to 10 protons; and Nein-22, 10 protons plus one with 12 neutrons. Most (but not all) elements can be divided into this way we go. In 1935, Canadian-American physicist Arthur Jafri Dampistair (1886-1950) found, for example, that uranium, like presentin nature, had a mixture of two we go, although its nuclear weight (238.07) contacted a molecular number. It was clearly because we were present in a very large proportion of ja. Uranium nuclear had a 99.3-per-100-92-protons and a nine of 146 neutrons, or which is the same, totalwhite number 238. These were uranium-238 atoms. The rest 0.7 per 100, on the other hand, have three low neutrons, and the uranium-235 atom formation. Since radioactive properties depend on the constitution of the atomic navies, not electronically, one element we can be chemically like ja, but is very different from their radioscreta point of view. So, while uranium-238 was half a life of 4,500,000,000 years, Uranium-235 was only 700,000,000 years old. In addition, both are parents of different radioactive series. There were ideological reasons that hydrogen itself, the simple element, we could contain a pair of ja. The common hydrogen atom, set by a single proton with a new, hydrogen setting-1. But in 1931, in American came the United States Camery, by The Heartof The Cleton Eurei (1893-1981), with each other four dry liters of liquid hydrogen; in the case that if a heavy hydrogen we were going to have, it would have a more boiling point, and more slowly evaporate, so it gathers in its suo-slot. In fact, in the last cubic centimeter of hydrogen, The Uranium was able to detect the exact signs of hydrogen existence, which had a system of a line other than protons. Hydrogen-2 Special Name Devatireyum Given Neither oxygen did get away with it. In 1929, American-American Camea William Francis Kalauqi (b. 1895) managed to prove that oxygen was made of three we go. Overall, the highest variety, total of nuclear containing about 99.8 per 100, oxygen was 16. Its sub includes 8 protons plus 8 neutrons. The rest was almost all oxygen 18 (8 protons plus 10 neutrons), with an oxygen-17 (8-protons plus 9 neutrons). It created a problem. Since the time of Berzelewis, the nuclear weight was based on the discretionary allocation of weight of 16, taking oxygen atoms. But the atomic weight of oxygen can be the average weight of only three we go, and the ratio of oxygen we go into can be slightly different from the sample sample. Physics set as equal to oxygen-16 by setting up the nuclear weight by 16, as well as the 16th, and it provided with a large number of values (physical nuclear weights) that were greater than each other, in very small quantities, that were used gradually and improved in the 19th century (chemical nuclear weight). But in 1961, international organizations of both chemistry and physics agreed to adopt a standard nuclear weight, that is 12 equal to carbon 12, which is exactly equal to 12. This new standard value was almost exactly what the old chemical nuclear weight was, and yet it was linked to the same we go, and not the average of many of them. Chapter 14 Atomic Rectonsontanent: 1. New Transmotitan 2. Artificial Radioscreta 3. Allioric elements 4. The new transmoitaon of the new naviati bombs1 is being clarified that the atom was made up of small particles, which was immediately organized into radioactive changes, the next phase was practically assumed. the person Deliberately rearrange the atomic structure of the molecules in the normal chemical reaction. Why is there no rearrangement of nuclear protons and neutrons in nuclear response? Certainly, there are more forces than the Protons and neutrons that join the atom within the inno, and the methods of taking the normal response will not be enough for the nuclear response. But the men who solved the radioscreta puzzle were on the bright path to success. It was Rutherford who took the first step. He has bombord different gasses with alpha particles, and found that sometimes an alpha particle hit with an atom and this fault (see figure 23). Actually, Rutherford demonstrated in 1919 that alpha particles can merge with nitrogen from the neo-neo-proton, and what was left. The most aperture of nitrogen we go to is nitrogen-14, which has a 7-proton and consists of 7 neutrons. Remove a proton and add 2 protons and 2 neutrons of alpha particle, and we'll find one that has 8 protons and 9 neutrons. It's about oxygen-17. Alpha particle can be considered as a heleme-4, and proton-1 as a hydrogen. Then it is that Rutherford proudly did out the first man-made nuclear reaction: Nitrogen 14+ Hem 4-> Oxygen 17+ Hydrogen 1 This is a real example of change from one element to another. In a way it was the panty of the old Risanya chaste, but, of course, with which elements and the tarachism al-Kimstas had also dreamed. Over the next five years, Rutherford responded to many other atomic reactions by handling alpha particles. What it can do, however, was limited, because radioactive elements provide low energy alpha particles. To get more, more dynamic particles were needed. Figure 23. Rutherford led the concept of experience corps, and opened the door to modern nuclear physics. Alpha particles eomosed by the radioactive source sour as they pass through a gold leaf. The degree of deviation was recorded when particles collided with the photography plate. Physics dedicated to the work of a mechanism designed to speed up particles charging themselves in an electric field, forced to move faster and faster, and thus keep as much energy as you can. English physics John Deigles-Caskston (1897-1967) and his assistant, Irish physics Ernest Thomas Walton (b. 1903), were the first to design a fast-moving design capable of generating enough particles energy to take What they achieved in 1929. Three years later, they blasted the lyteam atom with fast-moving protons, and produced alpha particles. The atomic reaction was: Hydrogen 1 + Latime 7 — > Helyme 4 + Hem 4In Cockcraft-Walton Apparets, and in others what was being offered, particles were faster in a straight line, and it was difficult to build equipment for long enough to generate too much energy. In 1930 American physicist Ernest Orlando Lawrence (1901-58) designed a fast-moving particle that forced a slow-moving according to the wide stupor. This type of a relatively small cyclotrin can produce the oradaon particles. Lawrence's first small cyclotrin was today's large half-mile frame of equipment, which has been used to try to answer basic questions about the structure of the case. By 1930, English physics pal Adrein Maares Darek (1902) suggested ideological reasons to assume that both the protons and electrons had to pass on the real opposite (opposite particles). Anti-electronic a electrolysis was to get massive but to be charged positive, while the anti-proton will have a proton mass, but will be charged negatively. In 1932, anti-electronic was effectively discovered by American physicist Cari David Anderson (b. 1905 37). When cosmic ray particles collide with the atomic nineine in the atmosphere, some particles are produced which in a magnetic field, just like electrons, but in the opposite direction. Anderson said this boy a bit. Anti-protons were detected for the second quarter of a century. As anti-proton is 1,836 times more serious than anti-electronics, 1,836 times more energy is required for its establishment. The necessary energy was not required from man-made devices until the 1950s. Using the giant master, Italian-American physicist Emoao Segre b. 1905-89) and his assistant American physicist Vivian Chamberlain (b. 1920) managed to produce and detect the opposite protons in 1955. It has been pointed out that very well the atom can be in which the negatively charged new, anti-proton stake is surrounded by positive charging posatrone. Such antimatter may not exist on earth for long or, perhaps, nowhere in our galaxy, because both the matter and the antimatter about its contact will be anointed in a great explosion of energy. However, the Hgols wonder if it is fully configured. If they did so, they'll be very difficult to figure out. 2. Artificial Radioscreta First Successfully created we were created that was already known for being in nature. But it was not always like this. Suppose a collection of the sadhela-protons did not exist in nature, as the first organic inno of the century was created that was not even given in nature. This trend was originally achieved by the 1934 French physics team, husband and wife, Friedrich Jolyu-Curie (1900-58) and Irene Jolyu-Curie (1897-1956), the post-Curie daughter (p. 217), famous for her work on radio. Joleo was attacked on aluminum with alpha particles. After obstructing the bombing they discovered that aluminum released to rein particles by itself. They discovered that they had started with aluminium-27 (13 Protons Plus 14 neutrons), and ended up with The Force-30 (15-Protons Plus 15 neutrons). But the force, as presented in nature, contains a atomic variety, the Fsforce-31 (15 Protons Plus 16 neutrons). Thus, the Force-30 was an artificial one we had to go, which did not present itself in nature. Which was why he was not in it; Was radioactive, with only fourteen days of half life. Their radioscline was the source of constant particle radiation that Joleo-Curie observed. The first case of The Liscous radioscline was developed by The Joleo-Curie. Since 1934 thousands of non-present we are established in nature, and all of them are radioactive. Every element is one or more radioactive we go. Even with one of hydrogen, hydrogen-3 (also called the treatome) with half a life of twelve years. A rare carbon we go, carbon 14 was discovered in 1940 by American-Canadian chemist Martin De Radioactive (B1913). Part of this we go is set by the bombing of cosmic rays on nitrogen in the atmosphere. This means that we are constantly breathing some carbon 14, and are including it in our abyss, just like all life forms. Once the living form dies, its join ends and carbon-14 is already silently absent. Carbon 14 is about half a life of 5000 years, so that significant amounts remain in the history of a material (wood, textile) again in the early hours. American chemist Wallared Frank Laby (1908-80) expresses a technique to find the age of archaeology his carbon remains by 14 materials, as soon as the earth's crystal age can be achieved from his uranium and leadership materials. Thus, chemistry has become a direct application for historians and archaeology. Chemical compounds can be handled with small we're going Included instead of the general public. This can be, for example, exceptionally stable we go (hydrogen-2 hydrogen instead of carbon-12, nitrogen-15 instead of nitrogen-14, and oxygen-18 instead of oxygen-16). If animals are to mix such marked compounds and then analyze their species, the compounds we are going to have will provide meaningful information. It is possible to speculate the mechanism of response within the living tissue, which would otherwise go unheeded. One innovation in this type of work was german American biochemistry Rudelf Sachonahimer (1898-1941), which conducted significant research on fats and proteins using hydrogen-2 and nitrogen-15 in the year after 1935. Radioactive makes it possible to rebuild the response even more accurately than the use of JA, but until after World War II, it was not available in the quantity we were going to have. An example of what we can do with Ja was the work of American biochemistry mel Calvin (b. 1911). He used Carbon-14 during the 1950s to track many responses involved in the photo-photo-de-photo-process. And he took it in a detail that was decided completely impossible just twenty years ago. Not only were we artificial lying but also artificial elements. 1937, Lawrence, by the designer of The Cyclatron, had bombed the model of The Moulabadanam (Atomic No. 42) with devaterone (hydrogen-2 cores), and sent the sample out of the blast to Rome, to Seston. (Segé will return to the United States, and in his new residence he will discover the opposite proton.) In an intense study, the sample was found that a new radioactive substance contains signs, which resulted in the atomic number of this element which was 43. After that, this element was not discovered in nature (despite some false alarms) and was therefore called the tachinatome, the meaning of the Greek word artificial. Then, the rest of the three differences in the distance table were full. I discovered elements 1939 and 1940 no. 87 (P.R.A.) and No. 85 (as Tata), and in the 1947 final difference, an according factor no. 61 (Promekao), was full. All these elements are radioactive. In The Pherancim, only small amounts of uranium are made, and their deficiency is explained that they had not been discovered before. The tachinatome and the prometomy are also set in small quantities, and their museum is the fact that they are the only elements of the nuclear number less than 84 which are not the only elements of any stable we go. First particle of allioric elements Atomic nine was charged for taking bombs positive: Proton, Devateraon and Alpha Particle. Such positiveally charged particles are negatively rejected by the nuclear-charged nav, the power charges of the same sign takes too much energy to force each other to overcome this hatred and conflict with each other, so the nuclear response was very difficult to get. The discovery of the sadalah opened up new possibilities. For the neutrons descended , the atomic new will not follow them . A suppline can easily collide with a nuclear, without resistance, so the sadla had the right to move in the right direction. The first detail to probe the deadly bombing was Italian physics Enrico Fermi (1901-1954). He started his work almost immediately after learning of the discovery of The Daedila. They found that a deadly bean was particularly effective in starting the atomic response, if it was first passed through water or peraphin. These compounds absorbed some of the liquid energy in each collision, and it did without absorbing the neutrons themselves. In this way, there were neutrons until they moved at the normal speed of the inns at room temperature. Such thermal neutrons remained in a given area for each other's part with each other, and were absorbed more likely than fast neutrons. When a recuse is absorbed by a nuclear function, it does not need to become a new element. It can only become a heavy we go. Thus, oxygen-16 achieved a sire (with a large number of 1), it will move oxygen 17. However, a factor by getting a sinew can become a radioactive one we go. In this case, a beta will generally be worn out by the release of the particle, which according to the principle of the saoadi means that it will become an element that holds a high position in the distance table. So, if oxygen-18 achieved a recuse, it would move into radioactive oxygen-19. We will go give a beta particle and become a stable fluorid-19. Thus, oxygen will become another factor by the nuclear bombing (a large nuclear number). In 1934 it occurred in Fermi for uranium of bombs with neutrons, to see that it could produce nuclear heavy from uranium (transranaic elements). At that time uranium table had the largest nuclear number, but it could only mean that elements of high nuclear numbers had long been too low to survive in the past. Earth. First, Fermi really believed he had handled element no. 93, but the results he had achieved would be described as soon as possible, due to confusion and something more spectacular. These other results are likely to be created by transranac elements, focusing for a few years, worried. However, in 1940, American physicist Edwin Matmeclean (b. 1907) and his assistant chemist Philip Haagi Ablsaon (b. 1913), in his work on the nuclear bombing of uranium, actually detected a new type of atom. When studying, it was done according to atomic number 93, and they called it Nepon. Even the longest living nepon we go, Nepon-237, had half a life for more than 2,000,000 years, not enough to allow it to survive through the long history of the earth. The Nitapoonao-237 was the test of a fourth radioactive series. McClean was then joined by American physics Glenn Theodore Siabawarg (b. 1912), as well as he established and identified The Floating, Element No. 94, in 1941. In the direction of Siabawarg, a group of scientists from the University of California, over the next ten years, Minmrmelkollam is half a dozen new elements: Amrayum (95 No. 96), Berkilyus (No. 97), Calafonium (No. 98), Anestium (No. 99) and Firmium (Number 100) There was no reason to assume that no atomic number was represented at all. However, each factor was more difficult to make than the previous one, and occurred in small quantities. What's more, half the life became so short that the brightness that set fast and fast. However, I was established in 1955 Mandileoo (No. 101); In 1957, Nobel (No. 102), and In 1961, The L.A. In 1964 Russian physics published very small quantities of item no. 104. Siabawarg and his group found that the duplicate dorcelements were like each other, and therefore, for rare and hence. New electrons are added to an internal electronic battery, which is leaving the outer ootist electronic battery with continuous material of three electrons. Two groups of similar elements are different from the oldest name, which begins with The Lonthanam (Atomic No. 57), that of The Lannades, the most modern, which starts with the etanum (atomic number 89), that of The Akatanadis. All the akanadas were established with the discovery of The Levarunkao. Factor No. 104 expects that there are quite different characteristics than The Akanadas. What was the actual work of fermi during the uranium bombing with atomic bombs but neutrons? doubt of him Element 93 cannot be verified, because working to isolate all physics failed. Among those who had joined the research, H and Meitner, the dascooras of The ProductAnom twenty years ago. He treated the barium bombing, in which the pre-cisiputed had made a special part of the hard radioactive material. This response had made them assume that one of the bombings had radio products. Radius is chemically very bariam, and it is expected that it is with the bariam in any chemical seriation. However, the radio could not be achieved from the lines containing the bereme. Around 1938, He began to wonder that this barium would not be itself radioactive to us which was established from uranium during the military bombing. This radioactive bariam will be found with normal bariam, and two compounds cannot be separated by the common chemical technique after that. However, such a combination seemed impossible. All known nuclear reactions were involved in changes of only 1 or 2 units in the nuclear number until 1938. A reduction in uranium change in the barium means 36 in nuclear number! It would be like thinking that uranium was divided by half (uranium fission). H has also resisted the chase with such a possibility, at least in the public. In 1938 Nazi Germany attacked austria An Austrian, an Austrian, was forced into exile because of his Jewish origin. From their place of exile in Sweden, the risks have gone through it to those who are very small, and they have published the theory of H-uranium nuclear, when bobbarded with neutrons, faced a fission. This article created a great motivation because of the terrible possibilities. If a uranium atom, by absorbing a sinus, breaks into two small atoms, they will actually need less neutrons than exist uranium atoms [38]. When they will exclude non-neutrons, and other uranium absorbed by nuclear, they will also hunt a division, and give even more neutrons. Along with uranium of each stage, China's nuclear response will cause many others with a similar result of the chemical Reaction of China, in which hydrogen and the chemical of the clones are similar. But because the nuclear reaction is more involved in energy exchange than chemical reactions, the consequences of a chain nuclear response will be much stronger. Starting with a few neutrons, with equal energy investment, their huge reserves can be released World War II was about to break out. The United States government fears that the great energy of the nuclear new world may be truned by the Nazis and launched a research programme to get responses to such a series and put weapons in its own hands. The odds were many. The collision was completely as necessary as many neutrons as possible, before they abandoned uranium. Therefore, uranium had to be in large quantities (size is needed on a significant scale), to give neutrons the necessary opportunity. However, when the probe had started very little uranium, the substance was a little requested before 1940 as. Neutrons were delayed to increase the chance that they would be absorbed by uranium. This means using an administrator, a substance with light atom which will bounce neutrons. Such administrators can contain the greifitor or heavy water blocks. For extra difficulty, not all uranium nuclear absorbs a sirewhen an unusual, but only rather- rather-un-so-difficult uranium-235 we go, to isolate and force the idea of ways to focus uranium-235. It was an extraordinary task, because we had never done the separation of jaa a mass until then. One successful method was to use uranium heafluoradi, which has a lot of progress in managing fluoride compounds. The Plotneum, a man-made element, was also created to produce large quantities of it in the FIA, and in 1941 attempts since its discovery. Fermi, who left Italy in 1938 and left for the United States, was in charge of the job. December 2, 1942, a nuclear stack of uranium, uranium acid and greifite reached significant sizes. China's response was maintained, energy production through uranium fission. By 1945, some devices were developed, which contains a small load of explosives, and two pieces of uranium are collected. Each piece was massive separately, but with each other they pass it. Due to the firepower with cosmic rays, the atmosphere always consists of lost neutrons, so that an immediate China atomic reaction begins in the main mass of uranium, which then fits with anger to the unimaginable. In July 1945, the first atomic bomb or a bomb (called a fission bomb) was exploded in Almogordo, New Mexico. A month later, two more bombs were produced on Hiroshima and Nagosai in Japan at the end of World War II. However, Fassa It is not used specifically to destroy. When energy production is constantly maintained and at a safe level, it can be used for constructive purposes. Nuclear batteries, changed to more accurate names as nuclear characters, have been perolafrosted during the 1950s and 1960s. They are used to produce the sub-ships and surface, and in the form of electricity, to generate energy for decent purposes as well. In addition to the fission of heavy nuclear, energy can also be achieved in a somewhat heavier one (nuclear fusion) than the two light nuclear-bound navies. In particular, energy made by merging the heme new, and merging the heme nine, can be achieved. Because of the union of hydrogen atoms, controlling the safety of the electrical surrounding sesame, much more energy should be managed. Such energy arrives at the center of the sun and other stars. Solar radiation (which is not rejected for more than billions of years that amounts to earth) is energy produced by the nuclear fusion of millions of tons of each other hydrogen. In the 1950s, essential energy can be achieved by a fission bomb blast, and methods were developed to use this bomb as a trembal for a variety of larger and more destructive nuclear bombs. The result is that a hydrogen bomb, H pump, interchingable, or more accurately known as fusion pump. Fusion bombs were built and thousands of times ago the destructive capability of the fassod bombs destroyed two japanese cities. A single fusion bomb can completely destroy the largest city, and if all existing fusion bombs are left out in different cities, life can be directly blasted and by fire and by the dispersal radioscreta (radioactive rain). But Willy Pump can also have applications out of all kinds of destruction. The most important experiment currently underway is to try to create extremely high temperatures, billions of degrees, in a controlled manner (and not at the center of a blast-related pump), and to maintain enough temperature to trembal a fusion response. If this fusion response is achieved in the control rate, a fantastic amount of energy can be achieved. Fuel will be deotereyum, or heavy hydrogen, which is in great quantity in the sea, for a large number of American millions of years. So far, the castes He had never faced the possibility of a total end with the war of fusion bombs, nor did he have the opportunity to rely on the same fusion bomb that prevailed in unprecedented prosperity. Any of these floors can result from a branch of scientific development. We are gaining knowledge. Science provides us. From now on we also need authenticity. Comment: [1] Smith-Blacksmith, A. (T.N.) [2] □ Chemical art has also been developed in India and China. However, the intellectual development line in chemistry starts with Egypt, so I will limit my exposure to this line. [3] Element is a Latin word of uncertain origin. The Greeks did not use it, but it is so important in modern chemistry that there is no way to avoid its use, even when referring to Greece. [4] It's easy to smile in these newtheories, but in fact the ideas from Greece were very deep. We try to change the terms of such 'gas', 'solid' and 'energy' with terms of 'air', 'water', 'earth' and 'fire'. The gasses can cool when liquid swells, and cool ingest so cool. This situation is very much like this concept from Anaimanas. And Heráclito's idea of fire is now like that on energy; Agent and chemical reaction result. [5] Cosmic rays contain particles entering the earth's atmosphere from outer space. Particles (mostly protons) are powered by stars and galaxy power fields attached to themselves at almost unimaginable energy by speed. Generally, the mass of an atom, the number of neutrons is required in proportion to its massive number. Thus, calcium-40 consists of 20 neutrons, a 50 per 100 of its white number, while uranium-238 consists of 146 neutrons, a 65 per 100 of its white number. [7] Interesting, only English language translation of agricultural work, published in 1912, is the President of the United States after Robert Hoor, a my engineer by the professional, and his wife. A stunning edition with pictures taken from the original is made by Dover's pa. [8] It should be noted, however, the change studied by the boiler was not a chemical change. Air, whether complex or extended, remains air. Such a change in volume is a physical change. Studying physical changes in chemical compounds is related to physical chemistry. It was not a real existence for two centuries after the time of the boyel (see chapter 9), but he kept the foundation. [9] Is alchemist and chemistry. (T.N.) [10] The law was incomplete at the beginning of the twentieth century, but the reform is very small because of the growing upbringing of science of this century, and in response to the fact that it usually has a place in the laboratory. [11] In that he proved to be right. [12] Russian Kimia Mekhyal Velomonósov (1711-65) advanced theories of Lawasier in almost twenty years, rejecting the flogast theory in 1756 and suggested that the objects be combined by burning with a part of the air. Unfortunately he published in Russian, and Lawasier, including Western European chemists, were not aware of his work. Lomunao also had amazing modern ideas on atom and heat which were 50 or 100 years before their time. He was a very remarkable man who was quite unhappy to be born in Eastern Europe at that time, while scientific development was focused in the West. [13] It is true that some substances may differ in their basic constitution, in certain limits. These are special situations. The focus of 1800 chemistry was that simple compounds were firmly in line with the clear proportions law. [14] A century after Dalton, this approach had to change. An atom, after all, can be converted into the methods used to achieve it, however, no such rasanya ever imagined them, nor has it taken them out. [15] It was actually the initial defeat of Vatulsam who retained his influence in other parts of chemistry. Despite its slow weakness throughout the 19th century, Vatulsim is still not fully dying today. For a full explanation of the various stages of the fall of Whatsasim, see my book Short History of Biology. [16] Chemicals today have not yet offered the most complex products of living agents. However, it is generally accepted that, in principle, it takes only time and effort to get the most complex innow (in some cases certainly the amount of time and effort prohibited). [17] Labbig was one of the great master of chemistry of all time. He taught at Gassan University, where he established the first real chemical laboratory course. Several chemists studied and learned laboratory techniques with it. Labbig was one of those who marked french domination in the 18th century, almost to become a German feud in the 19th century. [18] Some properties certainly do not mean all attributes. Sudeme is essential for the cloudy life, sudeme bromide is mildly toxic and nandi Immediately action is a toxic poison. [19] In the real Argamatalaq compound, the metal atom is attached to a carbon atom. Compounds such as zinc actati (a type of substance known before the Frankland period) are organic acid salts. The metal atom in these salts is attached to an oxygen atom, and these authentic compounds are usually not considered. However, the presence of three double bonds in benzene created a problem, as compounds with double bonds generally faced some kind of reaction that Benzene generally did not tolerate. Nearly three-fourths of a century found an explanation for the puzzle of dual links that they do not work as double links. [21] Bayyar's theory of tension rings with atom on an airplane. Atom does not have to be on the same plane, and all kinds of odd rings (and indeed forms) in which this restriction does not exist. [22] The sunnas of Mandeliyo in this regard have been done correctly, although it was not known until half a century later. However, one important addition was the example of american chemistry introduced by The Robert Newton Lewis (1875-1946). In 1923, in a classic book of dynamics, he introduced the concept of activity. A female activity is not the same for her detention, but is related to it. The equation of chemical dynamics can become more precise and has been widely changed by extended activity detention on the domain. (24) The development of knowledge in the field of biological chemicals (i.e. chemical reactions, controlled by the rawmen generally, released in living wells) is treated only in passage in this book. My book discuss more detail in the short history of biology. [25] Tests for the existence of nuclear (approximately 1/100000000 cm in diameter) and even small particles continue to collect intensely since the time of the parran. Some of these tests are detailed in the last three chapters of this book. As a part of this story that began with The Magnet, German-American physicist Arun Moeler (1911-77) invented field emission microscopes. The mid-1950s photos were taken with his help, now the classic, which ordered individual nuclear at the end of a metal needle really looks. (26] The concept of absolute zero, the lowest possible temperature, was proposed by Thompson (Lord Callion) in 1848. In recognition of this proposal, absolute temperature scale (based on The Idea of The Clyon) Like K. In 1905, Nernst showed that the durity was equal to zero at absolute zero (third principle of dynamics). From this, it may be excision that it is possible to see as much as absolute zero temperature you want, but it can never be achieved in action. [27] by 1833, Graham had studied various forms of pwasforaq acid, and showed that some of these hydrogen atoms could be converted by a metal. He introduced chemicals into the existence of polybasic acids. [28] For more details on the subject, I cited my book the reader interested in the biological code (The Orion Press, 1963). [29] The extent to which this polymerization depends on the time during which the moonmores are allowed to react to the temperature and pressure under which they react, the presence or absence of other materials that can speed up or delay the response, etc. Modern chemistry, taking it all into account, can practically design its own final product. [30] Rubber is a natural palaemer prepared by some analynosis plants. In its natural condition it is very visous to be very difficult, completely useful in hot weather or cold weather. American mover Charles Sal (1800-60) discovered, in part by accident, was slippery hot rubber dry and flexible in a wide range of temperatures. He patented his Own-Welcome Rubber in 1844. Rubber really got the right to citizenship in the 20th century, with the need for automobile development and a lot of tyre. (31) The power printers in the 18th and 19th centuries, starting with Benjamin Franklin, have been assumed to have been positive negative calls for current flow. The Kruukas now showed that the assumption was actually wrong and the flow was positive from negative. [32] Such forms of high pressure are usually usually light as soon as pressure is done. Diamond is a discount [33] these figures are based on a contract from where a proton load is equal to + 1, and on an electric 1 [34] course, positive ions have been lost by electrons, and negative ions have won them. Therefore, a stom ion has fewer electrons than its atomic number, while an ion-cloud has more electrons than its atomic number. [35] Such a ningy proton is very active, and does not last until then. In water solutions, it immediately binds the water inno, a positive charge to the inno. How is it The Oenom Ion (H_3O^+ has been established). [36] In the time of Saaoadi, it was thought that it had many electrons and particle damage As well as an extra proton left un-neuteralyd electric. This resulted in positive burden. Today it seems that it consists only of protons and neutrons, but it is an electrical set up and is finished when a terminal becomes a proton, because the amount of damage to achieve a positive charge, by emission, a negative charge [37] is not much more than exactly one, in fact. Large scale small deviations are not important in chemistry, but they are reflecting the energy that has been shown in nuclear weapons, the huge energy involved in the nuclear forces. [38] It also participates in the difference sedate above in half life of the natural torium (Torav-232) and is formed from Toryum Uranium (Torav-234), each of which includes two additional neutrons. Core.