University physics with modern physics study guide

Did you know that if you squeeze all the problems that make up everyone in the world together, it can get into the size of a sugar cube? That's because atoms consist mostly of empty space between very small and very dense nuclei. If you are interested in facts and physics numbers that blow your mind, you might consider the SAT Physics Subject Test. This comprehensive guide will go beyond what's on the test (don't worry, nothing about sugar cubes). It will also tell you where you can find the best SAT Physics practice tests, and study tips and strategies you need to know to master sat II. There's a lot we cover in this guide, so here's the table of contents so you can easily find the specific information you're looking for. Physics Subject Test Format Types Of Questions on Physics Subject Test Concepts Tested on Physics Subject Tests Where To Find Practical Tests How to Learn to Test Tips Physics Subjects When To Take Physics Subject Tests How Are Physics Subject Tests Formatted? SAT II in Physics is 60 minutes away and asks 75 multiple choice questions. Each question has five choices of answers. There are several independent questions, while others are grouped and ask about the same graph or image. Perhaps surprisingly, you can't use the calculator on the Physics Subject Test. With less than a minute to each question, the test doesn't present too complicated math. There are three main types of questions, which are important to understand so you can know which skills to apply. Types of Questions on The Physics Subject Test Three types of physics questions are recall, single concept, and some concept problems. The recall question makes up 20% to 33% of the test. They are rather easy and test your understanding of the concept of physics. This is an example of a recall question: Answer: Problem concept E Single makes up 40% to 53% of the test. In addition to remembering concepts, you must apply physical relationships, formulas, or equations to solve problems. These questions test your understanding of the relationship of algebra, trigonometry, and simple graphics, along with the concept of ratio and proportion. Answer: E Some concept issues account for 20% to 33% of the questions. They have the extra step of asking you to remember and unify two or more different relationships, formulas, or equations to solve the problem. Answer: Now that we understand the format of the test, let's break down the content on the test further so you know what to learn for the test. As you will see below, it focuses mainly on mechanics and electricity/magnetism. What is Tested on a Physics Subject Test? According to the College Board, SAT II in Physics covers mechanics, electricity and magnetism, waves optics, heat and thermodynamics, modern physics, and more Concept. Questions of mechanics and electricity/magnetism form more than half the tests. Let's see how the test breaks down. Mechanics: 36% - 42% Kinematics, such as speed, acceleration, movement in one dimension, and projectile movement Dynamics, such as strength, Newton's law, static, and friction Energy and momentum, such as potential and kinetic energy, work, power, impulses, and conservation laws Circular movements, such as uniform circular movements and the centripet forces of simple harmonic movements, such as mass in spring and pendulum gravity, such as the laws of gravity, orbit, and the laws of Kepler Electricity and Magnetism: 18% - 24% Field of electricity, strength, and potency, such as Coulomb law, induced costs, field and potential group point charge, and charged particles in the field of electrical Capacity, such as parallel plate capacitors and behaviors that vary time in the filling / discharging of circuit elements and DC circuits, such as resistors, light bulbs, series and parallel networks, Ohm Law, and Joule Law Magnetism , such as permanent magnets, fields caused by currents, particles in magnetic fields, Faraday Law, and Lenz Law and Optical Waves: 15% - 19% General wave properties, such as wave speed, frequency, wavelength, superposition, diffraction of standing waves, and reflection of Doppler effects and refraction, such as Snell's Law and changes in wavelength and speed such as image formation using pinholes, mirrors, and physical lens optics, such as single slit diffraction, double fission disorders, polarization, and color Heat and Thermodynamics: 6% - 11% Thermal properties, such as temperature, heat transfer, specific and latent heat, and thermal expansion The laws of thermodynamics, such as the first and second laws, internal energy, entropy, and heat machine efficiency of Modern Physics: 6% - 11% Quantum phenomena, such as photons and atomic photoelectric effects, such as rutherford and bohr models, atomic energy levels , and atomic spectra Nuclear physics and particles, such as radioactivity, nuclear reactions, and fundamental particles of Relativity, such as time dilation, Long contractions, and mass energy equality Others: 4% - 9% General, such as the history of physics and common questions that overlap some of the main topics Analytical skills, such as graphic analysis, measurement, and mathematical skills Contemporary physics, such as astrophysics, superconductivity, and chaos theory In addition to these concepts, you must memorize certain formulas that express certain physical relationships, such as F=ma you should be able to manipulate equations, read graphs, understand metric systems, and apply laboratory skills to answer questions. Is there anything you don't need to know? Although this test is very comprehensive, there are a few things you don't have to worry about. You don't need to know the identity of trigonometry, vectors and graphs, or physical constants. The Physics Subject Test includes a lot of content, and requires your ability to apply those concepts to manipulate equations and solve problems. In addition to studying and studying in your physics class, what materials can you use for the preparation of subject tests? Where to Find the SAT Physics Practice Test you can prepare for the Physics test with high quality practice questions in the book and/or online. First, our book recommendations: Using official practice questions is always the best way to prepare for an SAT or SAT Subject Test. The College Board currently only provides physics practice questions in its All Subject Test Study Guide. While the question is of high quality, as it comes from the previously given test, there is actually only one exercise test to try. Obviously, this is very limited, so you'll want to supplement it with another book. You may try to study first with other books and then take a College Board practice question a week or two before the Subject Test to make sure you are ready. Since this is a given test beforehand, it will be a good benchmark for predicting how you will score, and it can reveal any concept you need to learn last minute before the day of the test. For a comprehensive overview of concepts you need to know and high-quality practice questions to implement them, I recommend princeton review's Cracking the SAT Physics Subject Test. You can use this book year-round in physics classes to review concepts and make sure you can apply them to SAT Subject Test questions. One of the drawbacks of the Princeton Review is that explanations can sometimes be confusing and difficult to follow. Barron's is also a good choice with high quality exercise questions. However, some concepts are lacking, so don't rely on it to be completely comprehensive. Barron would be better to use two to three months before your Subject Test, after you review in class and with the Princeton Review throughout the school year. Finally, the other two options are Kaplan and McGraw Hill, but they will be my last recommendation. Kaplan's questions are too easy, so they won't be quite prepared. McGraw Hill's questions have the opposite problem - some are too complicated to solve without a calculator, and thus inaccurate preparations for the SAT Subject Test. In addition to books, you can also find SAT Physics questions online from these sources. Online Practice Questions You should definitely try the College Board's 36 online practice questions. Be sure to thoroughly read the explanation of the anything you don't believe in or don't know. Then review the concept, from your class or other test preparation material, and take note and do practice issues to improve your understanding. Varsity Tutors have many useful practice questions that are broken down into subsets of concepts. This is is a good way to really identify what you know and what you need to review. Similar sites also have useful practice questions that you can score automatically, along with several glossaries and study guides. Finally, Sparknotes, despite having no practice questions, has an informative overview and glossary of terms. How to Prepare Effectively for a Physics Subject Test Now you have a lot of good resources for The Physics Subject Test, but how can you use it effectively to maximize your score? This section is more than three key study tips to follow. #1: Use Physics Subject Test Class Material is a challenging test. It covers a lot of material, and this material takes a lot of time to learn. Thus staying focused and up to speed in the classroom is essential, as well as reviewing practice concepts and issues frequently to maintain your cumulative knowledge. When you go through your physics class, you should review your class assignments along with test preparation books like the Princeton Review or Barron's. Then you can actually do more intensive test preparation in the two to three months before the Subject Test. Be sure to do an exercise test a few weeks before the test to get a sense of your good preparation and fill in the last minute gap in knowledge. When you take this exercise test, you should make sure to spend some time on your own. #2: Time Yourself physicist John Wheeler Archibald explains, Time is what prevents everything from happening at once. With the Physics Subject Test, you may feel it all happens at once because you don't have much time at all. Setting your own time while you take the exercise test will help you with pacing and time management. As you strengthen the ability to answer questions quickly and efficiently, you'll both score higher and breathe easier so you have enough time to get all the questions and answer them well. When you take a full exercise test, give yourself exactly 60 minutes and sit in a quiet room with some distractions. The more you practice under simulated test conditions, the more prepared you will be on test day. After you take the test, you want to print your questions actively and critically. #3: Analyze Your Answers Correcting your exercise test should be a very active process. By this I mean don't just let the wrong answers or lucky guesses go. The wrong or skipped answer is the opportunity to actually analyze the question, diagnose your weaknesses and misunderstandings, and find out where you need more preparation. If you're wrong question, mark it in the notebook. Find out why it's wrong—don't you know the concept, misunderstood the question, or made a careless mistake? If it's the first one, you'll definitely have to go back to your notes and reviews. Then find practical questions that test those concepts. So many Physics Subject Tests are about application, not just remembering. If you understand questions or make careless mistakes, you may need to focus on time management and your ability to focus and work efficiently. Practicing in timely conditions, as mentioned above, is the best way to practice these skills. The exercise test will reveal where your strengths and weaknesses lie. Each question is an opportunity to determine what you know and what you need to learn more about. Remember important formulas, like this. Test Taking Strategies for Physics Subject Tests In addition to getting ready through test preparation, there are several strategies that you should keep in mind when taking the Physics Subject Test that will help you improve your score. #1: Know Your Formulas You can't carry a formula sheet when you take the Physics Subject Test. This test will give you some constants, but you should know the formula that expresses physical relationships. Note that you also can't bring the calculator into the test. While it may seem like there are many formulas to keep in mind, they will probably start to seem intuitive the more you understand the laws and concepts of physics. If there is something difficult to remember, it might be a good idea to write this formula in your test booklet at the beginning of the test. This way you can refer back to them as you go along. Make sure you know the formula as you learn, and how to apply it to single concept and multi-concept issues. #2: Use The Process of Elimination On a Physics Subject Test, you lose 1/4 point for each question you answer incorrectly. If you can't eliminate any choice of answers, you should leave the question blank and avoid a points deduction, but if you can eliminate at least one wrong answer, then you better make your best guess. Go through the answer options and see which ones you can cross off as definitely wrong. It may also jog your thinking in a way approaching the correct answer. #3: Don't Stay With 75 questions in 60 minutes, you have less than a minute to spend on each question. If one of them confuses you, it's best to mark it, skip it, and get back there at the end of the exam if you have time. Remember, it's always a good idea to guess if you can eliminate at least one of the answer options. But don't spend a disproportionate amount of time on the problem, because all problems count the same against your final score. #4: Critical Reading Sure, this is SAT physics, not a critical reading test, but the same skills of close and critical reading apply. Make sure you understand exactly what the question is asking before rushing to answer it, and be wary of words like UNLESS, BUT, NEVER, or superlatives or other words that mark a shift in emphasis. The more you practice, the calmer you will be able to approach the question and implement this strategy. When You Should Take Sat Sat Physics Test? You can take the Physics Subject test on the test dates of May, June, August, October, November, or December. The College Board recommends that you have at least one year of college physics preparation before taking the Subject Test, as well as courses in algebra and trigonometry and experience in the laboratory. The end of the first year is a common time to take the Physics test, but some students may feel ready by the end of the second year. After all, it is best to take the test at the end of the academic year when the course content is fresh in your mind. You may also learn to finale, which will further strengthen your understanding. Remember, you cannot take the SAT Subject Test on the same day as the SAT, but you can take up to three Subject Tests in one day. It may be smart to take the SAT first, so learning your math can inform your physics preparation. With this in mind, a June test date would be an ideal time to take the Physics Subject Test. You can read about other considerations for scheduling your SAT Subject Test and a full list of dates here. With your study plan and test schedule all planned, you'll be ready to show off your physics skills on the SAT Subject Test and add this impressive exam to your college application. What's Next? Looking for study resources on some of these physics topics? See our guide to calculating acceleration, mass conservation laws, and specific water heat. What is a good score for an SAT Subject Test? Actually, what makes a good score depends on the test. Read about the good scores broken down by each Test Subject here. Are you preparing to take the PSAT? This article discusses everything you need to know for the redesigned PSAT, along with 8 free exercise tests for you to start preparing for. Do you consider yourself a math person? This 800 printer explains his best strategy for getting the perfect score on SAT math. Want to increase your SAT score by 160 points or your ACT score by 4 points? We've written a guide to each test of the top 5 strategies you should use to try to improve your score. Download it for free now: now: