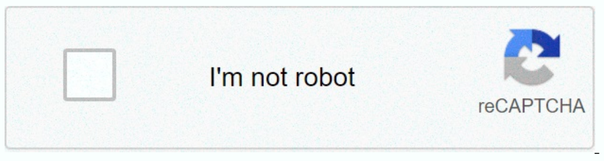

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Chapter 5 work and machines worksheet answers

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But Einstein said, E=mc2 4 Work does something moveWork is the transfer of energy when a force makes an object move. Two conditions A force must do something to move The direction of motion must be in the direction of the force Carrying books Work is a transfer of energy W= Fd (power to Newtons (kg m/s2, distance to m) 5 Practice problems P 128:1,2,3 Push a refrigerator with a force of 100N. If you move the refrigerator to a distance of 5m while pressing, how much work is done; Considering: Asked: ?units Type: 6 Given: Type: W = Fd Substitute: Answer: Page 128 Problem 1 A sofa is pushed with 75N power and moves at a distance of 5m across the floor; How much work is done to move the sofa; Since: Asked: Type: W = Fd Substitute: Answer: 7 Given: Asked: Type: W = Fd Substitute : Answer: Problem 2 A lawnmower is pushed with a force of 80N. If 12.00J of work is done in cutting the lawn, what is the total distance that prompted the lawn mower? Considering: Asked: Type: W = Fd Substitute: Answer: 8 Given: Asked: Type: W = Fd Substitute: Answer: Problem 3 The brakes on a car do 240,000J of work to stop a car. If the car travels at a distance of 50m while the brakes are being applied, what is the power the brakes exert on the car? Given: Asked: Type: W = Fd Substitute: Answer: 9 Given: Asked: Type: W = Fd Substitute: Answer:Problem 4 The force required to lift an object is equal in size to the gravitational force in the object. How much work is done in lifting a with a mass of 5,0 kg vertical distance of 2,0 m; Given: Asked: Type: W = Fd Substitute: Answer: 10 Power Power is the pace of work. How much work is done in 1 secP = W/t W (joules) joules = kg m2/s2 Unit for power is joules/the second called Watt A Watt is kg m2/s3 Since the work is transferred energy P= E/t 11 Example of power Push a box with a force of 100 N across the floor 5 meters that takes you 45 45 Your friend pushes a similar box, too, with a force of 100 N also 5 meters across the floor, but it only takes your friend 30 seconds. How much work do you each do? How much energy do you each spend? 12 Problem 1 Page 130 When lifting a baby from a crib, 50 J of work is done. How much power does it take if the baby is lifted to 2 s? Given: Asked: Units? Type: P= W/ t Substitute: Answer 13 Problem 2 Page 130 If the power of a cursor is 130 W as it runs, how much work is done by the cursor in 10 minutes? Given: Asked: Units? Type: P= W/t Substitute: Answer 14 Problem 3 Page 130 The power generated by an electric motor is 500 WProblem 3 Page 130 The power generated by an electric motor is 500 W. How long will it take the engine to do 10,000 J of work? Given: Asked: Units? Type: P= W/t Substitute: Answer 15 Energy and Work 16 P130 Practical Power Problems: 1,2,3 You have 900 J of work pushing a sofa. If it took 5s to move the couch, how much energy did you use? Taken asked? Units? Type Substitute Answer 17 Section Review P131: 5,6,7 Work is a power transfer W = Fd (power to Newtons (kg m/s2, distance to m) N*m or Joules Power is the rate of work. How much work is done in 1 sec P = W/t W (joules) joules = kg m2/s2 , t= seconds Joules/sec = Watt 18 Machines (P132) A machine is a device that makes the job easier. Simple Machines (Not Mechanized) How Machines Make Work Easier A machine can increase the power applied to an object.- Car jack (p 132) Multiply power A machine can make the job easier by increasing distance reducing power required. Ramp (p133) A machine can change the direction of the force separation wedge (p133) 19 Work done by machines Figure 7 Page 133Choice – lift the chair directly to the height of the truck. W = Fg x height Or- drag the chair up to the ramp The work will be the same distance will be greater so the force will be less 20 Work, Distance and ForceMachines do not reduce work (real machines increase work), but can reduce the power required Ideal machine (p135) Workin = Workout Win = Fin * 5 m , Wout = Win Wout = 300 J but d=5m so F= 60N Wout= 0 100 N * 3m = J 5 m 3 m 100 N 4 m 21 Work input force factors – the force applied to the machineOutput force – the force applied by the machine's input distance – the distance the input force moves Output distance – the distance the output force moves. work at = input power x input distance work out = output force x output distance 22 Pulling a nail out = work in the shape 10 page 135hammer nail moves 1 cm to pull a nail Handle moves 5 cm Output force of 1,500 N Input force = ? 23 Ideal Machines (P135) Workin= WorkoutForcein X distancein= ForceoutX Distance Fin X 5cm = 1500N X 1 cm Fin= ? distance units cancel if the same unit 24 Ideal Mechanical AdvantageWorkin= Training Fin X din= FoutX dout F out Fin d in dout = F out Fin d in dout = 25 real Work< WorkinSome's input work is always converted to heat by friction. Efficiency tells us how much of the import job is converted to the production job. Workout Workin x 100% < 100% Effectiveness = 26 Assignment Chapter 4 Practical Problems Practice Problems P 128:1,2,3Power Practice Problems P130: 1,2,2 3 Section Review P131: 5,6,7 Page 137 - Apply Mathematics 5-6-7 27 Simple Machines Section 3Page 28 Types of Simple Machine MachinesSimple works with a single drive. Lever wheel pulley and axis tilt Airplane Composite Machines 29 Lever A bar that is free to rotate (turn) for a fixed PointThe fixed point is called the bracket input arm - distance from the input force to the bracket output arm - The distance from the output force to the bracket. If the output arm is smaller than the input arm, then the output force is greater than the input force. 30 types of levers (P138-139) First class lever second class LeverInput output power output power input power distance second class lever output distance output power output power output distance third class output lever input force input force 31 ideal mechanical advantage of leverforce output power input IMA = Power output x Length output=Input power X Input length L input L output IMA = 32 Types of pulley (P 141-142) Fixed pulley Input power 4NOutput Power 4N 4N Mobile pulley 2N Input Power output power 2N 4 N 4N 33 types of pulleys (cont) bar and 1N 1N 1N input power 1N 1N output power 4N 4N 34 ideal mechanical advantage of a pulley output power inputForce IMA = I AMA = Number of lifting strings 35 wheel and axle load (P143) ra rw IMA wheel radius = Radius of axelInput power rw Wheel output power radius Axel IMA radius = 36 Tilt plane 100 N IMA tilt length = SlopeF height= 100N , height = 3m W= 100 N * 3m = 300J W= 300J but d=5m so F= 60N 5 m 3 m 100 N Length of slope height IMA = 37 types of sloped planeramps, gradients, road degrees Screw Wedge IMA = slope length/height gradient Page 144 38 Compound machines Two or more simple machines working together. Can Opener Car Space Shuttle 39 Section 3 Review Page 146 Application Mathematics 40 Assignment Practical Problems P 128:1,2,3Power Practice Problems P130: 1,2,3 Section Review P131: 5,6,7 Page 137 - Application Math 1 5-6-7 Page 146 Application Math Practice Problem Page- Due Monday Note Download Worksheet- Due Monday Lab on Tuesday Chapter 5 Review Page 1-20, Due Wednesday's Test in Chapter 5 Friday 41 Types F out Fin d in the Dout Workout Workout x 100% < 100%F = m*a, FG= m*g unit kg m/s2 = Newton W= F*d N*m = Joule P= W/t or P= Unit E/t J/s = Watt (kW) F out Fin d in dout IMA = = Workout Workout x 100% < 100% Performance = 42 IMA of Simple Machines Workout Workin x 100% < 100% Efficiency = Output Power Input Power All Simple Machines MA = > 1 Lever L Input L Output IMA IMA Tilt height length of IMA gradient = ramped level radius of axel wheel radius and IMA axis = IMA pulley = Number of strings lifting workin working load x 100% < performance 100% = 43 chapter 5 revision lever input output arm IMA AMA AMA 25 75 B 53 42 C 36 D32 99 E 10 30 44 Problems Page 153 Given: Units Type: Substitute: Answer 45 Friday 7 November Get Out Your Calculators and Reference SheetsWhoy away your books and notes. Answer all questions on the test sheets Do not overlook the problems on the back of the test. When you are done, insert the test into the tray. Place all tasks on the tray After the test sit quietly and start reading chapter 6 on page 158. Engineer, input, production, ideal, exercise, ramp, lever, explorer, guided, workbook, Classroom.kleinisd.net ch. 5 work and machines - jflaherty1@kleinisd.net jflaherty1@kleinisd.net