PHYSICS

BOOKS - MODERN PUBLICATION

WORK AND ENERGY

Example

1. A force of 10 N acts on the object. The displacement is 8 m in the direction of force. The force acts on the object throughout the

displacement. What is the work done by the force?

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2. A pair of bullocks exert a force of 1400 N on a plough. The field being ploughed is 15 m long. How much work is done in ploughing the length of the field?

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3. A block is pushed by a force F = 10 N. A frictional force of 2 N acts between the block and the surface. Find the work done by the friction when the block moves 10 m.

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4. A block of mass 2 kg slides down an inclined plane of inclination 60°. Find the work done by the force of gravity as the block slides through 1m.

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5. A car is moving with a velocity of $54kmh^{-1}$. What is the kinetic energy of a boy of mass 40 kg sitting in the car?

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6. Suppose a hammer of mass 1 kg is falling freely on the wooden block, if the hammer fall from a height of 1 m. How much kinetic energy just before hitting the wooden block?

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7. A car accelerates uniformly from 18km per hour to 36km per hour in 5 seconds . Calculate the acceleration and the distance covered by the car in that time.

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8. If you apply 1 J of energy to lift a book of 0.5 kg, how high will it rise?

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9. A man throws a mass of 2 kg vertically upwards with a velocity of $20ms^{-1}$. What is the potential energy of the mass after 1 s?

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10. A billiards player hits a ball of mass m gram. The ball acquires a velocity v. What is the work done by the player on the ball?

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11. A rocket of $3 \times 10^6 kg$ mass takes off from a launching pad and acquires a vertical velocity of 1 km/s at an altitude of 25 km. Calculate the potential energy, and the kinetic energy.

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12. A rocket of $3 \times 10^6 kg$ mass takes off from a launching pad and acquires a vertical velocity

of 1 km/s at an altitude of 25 km. Calculate the potential energy, and the kinetic energy.

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13. A 5 kg ball is trhown up with a speed of 10 m/s. Find its kinetic energy at the time of throw.

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14. A 5 kg ball is trhown up with a speed of 10 m/s. Find its potential energy when it reaches the highest point.

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15. A 5 kg ball is trhown up with a speed of 10 m/s. What is the height to which it rises?

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16. A 5 kg ball is trhown up with a speed of 10 m/s. What is the work done by the force of gravity (mg)?

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17. A lamp consumes 1000 J of electrical energy in 10s. What is its power?

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18. Calculate the power of a crane in wtts,which lifts a mass of 100 kg to a height of 10 m in 20 s.

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19. A man whose mass is 50 kg climbs up 30 steps of a stair in 30 s. If each step is 20 cm high, calculate the power used in climbing stairs.

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20. If an electric bulb of 100 watt is lighted for 2 hours, how much electricity is consumed?

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21. a horse exerts a pull cart of 300N so that horse cart system moves with a uniform speed 18 km/h on a level road calculate the power developed by horse in watt and horsepower

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22. The linear momentum of a body of mass 2 kg is $16kgms^{-1}$. What is its kinetic energy?

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23. A force of 7 N acts on an object. The displacement is, say 8m in the direction of the force. Let us take it that the force acts on the object through the displacement. What is the work alone in this case?

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24. When do we say that work is done ?

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25. Write an expression for the work done when a force is acting on an object in the direction of its displacement.

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26. Define 1 J of work.

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27. A pair of bullocks exerts a force of 140 N on a plough. The field being ploughed is 15 m long. How much work is done in ploughing the length of the field?

Watch Video Solution

28. Write an expression for the kinetic energy of an object.

Watch Video Solution

29. Write an expression for the kinetic energy of an object.

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30. The kinetic energy of an object of mass 'm' moving with a velocity of $5ms^{-1}$ is 25 J. What will be its kinetic energy when its velocity is doubled ? What will be its kinetic energy when its velocity is increased to three times.

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31. What is power?Give commerical unit of power

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32. Define 1 watt.

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33. A lamp consumes 1000 J of electrical energy in 10s. What is its power?

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34. Define Average Power.

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35. Look at the activities listed below. Reason out whether or not work is done in the light of your understanding of the term 'work'. Suma is swimming in a pond.

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36. Look at the activities listed below. Reason out whether or not work is done in the light of

your understanding of the term 'work'. A donkey is carrying a load on its back

Watch Video Solution

37. Look at the activities listed blew. Reson out whether or not work is done in the light of your understanding of the term 'work'. A wind-mill is lifting water from a well.

Watch Video Solution

38. Look at the activities listed below. Reason out whether or not work is done in the light of your understanding of the term 'work'. A green plant is carrying out photosynthesis.

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39. Look at the activities listed belw. Reason out whether or not work is done in the light of your understanding of the term 'work'.

An engine is pulling at train.

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40. Look at the activities listed below. Reason out whether or not work is done in the light of your understanding of the term 'work'. Food grains are getting dried in the sun.

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41. Look at the activities listed below. Reason out whether or not work is done in the light of

your understanding of the term 'work'. A sail boat is moving due to wind energy.

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42. An object throw at a certain angle to the ground moves in a curved path and falls back to the ground. The initial and final points of the path of object lie on the same horizontal line. What is the work done by the force of gravity on the object.

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43. A battery lights a bulb. Describe the energy changes involved in the process.

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44. Certain force acting on a 20 kg mass changes its velocity from $5ms^{-1}$ to $2ms^{-1}$. Calculate the work done by the force.

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45. A mass of 10 kg is at a point A on a table. It is moved to a point B. If line joining A and B is horizontal, what is the work done on the object by gravitational force ? Explain your answer.

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46. The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy ? Why ?

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47. What are the various energy transformations that occur when you are riding a bicycle ?

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48. Does the transfer of energy takes place when you push a huge rock with all your might and fail to move it ? Where is the energy you spent going ?

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49. A certain household has consumed 250 units of electric energy during a month.How much energy is this in joules ?

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50. An object of mass 40 kg is raised to a height of 5 m above the ground. What is its potential energy ? If the object is allowed to

fall, find its kinetic energy when it is half-way down. Take $g = 10ms^{-2}$.

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51. What is the work done by the force of gravity on a satellite moving round the earth ? Justify your answer.

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52. Can there be a displacement of any object in the absence of any external force?

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53. A person holds a bundle of hay over his head for 30 minutes and gets tired. Has he done some work or not,? Justify your answer.

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54. An electric heater is rated 1500 W. How much energy does it use in 10 hours ?

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55. An object of mass 'm' is moving with velocity 'v'. How much work should be done on the object in order to bring the object at rest ?

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56. Calculate the work required to be done to stop a car of 1500 kg moving at a velocity of $60kh^{-1}$.

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57. Find the energy in kWh consumed in 10 hours is four devices of power 500 W each.

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58. A freely falling object eventually stops on reaching the ground. What happens to its kinetic energy.

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59. A rocket is moving up with a velocity v, if the velocity of this rocket is suddenly tripled, what will be the ratio of two kinetic energies?

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60. Avinash can run with a speed of 8 m/s against the frictional force of 10 N, and Kapli can move with a speed of 3 m/s against the frictional force of 25 N. Who is more powerful and why ?

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61. A boy is moving on a straight road against a frictional force of 5 N. After travelling 1.5 km, he forgot the path at cross roads of radius 100m. He moves on the circular path for one

and half cycle and then he moves forward up to 2 km. Calculate the work done by him.

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62. Can any object have mechanical energy even its momentum is zero? Explain.

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63. Can any object have momentum even if it mechanical energy is zero ? Explain.

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64. The power of a motor pump is 2 kW. How much water per minute the pump can raise to a height of 10m?

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65. The weight of a person on a planet A is about half that on the Earth. He can jump

upto 0.4 m height on the surface of the Earth. How high can be jump on the planet A ?

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66. The velocity of a body moving in a straight line is increased by applying a constant force F, for some distance in the direction of the motion. Prove that the increase in the kinetic energy of the body is equal to the work done by the force on the body.

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67. A ball is dropped from a height of 10 m. If the energy of the ball reduces by 40% after striking the ground, how much high can the ball bounce back ? $\left(g = 10m/s^2\right)$

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68. If an electric iron of 1200 W is used for 30 minutes everyday, find electric energy consumed in the month of April.

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69. A light and a heavy object have the same momentum. Find out the ratio of their kinetic energies. Which one has a larger kinetic energy?

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70. An automobile engine propels a 1000 kg car (A) along a levelled road at a spedd of 36 km/h. Find the power if the opposing frictional

force is 100 Now, suppose after travelling a distance of 200 m, this car collides with another stationary car (B) of same mass and comes to rest. Let its engine also stop at the same time. Now car (B) starts moving on the same level road without getting its engine started. Find the speed of the car (B) just after the collision.

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71. A girl having mass of 35 kg sits on a trolley of mass 5 kg. The trolley is given an initial velocity of 4m/s by applying a force. The trolley comes to rest after traversig a distance of 16m. How much work is done on the trolley ?

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72. A girl having mass of 35 kg sits on a trolley of mass 5 kg. The trolley is given an initial

velocity of 4m/s by applying a force. The trolley comes to rest after traversig a distance of 16m. How much work is done by the girl ?

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73. Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it. How much work is done by men in lifting the box?

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74. Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it.How much work is done in just holding it? $\left(Takeg = 10ms^{-2}\right)$.

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75. What is power ? How do you differentiate killowatt from kilowatt hour ? The Jog Falls in Karnataka state are nearly 20 m high. 2000 tonnes of water falls from it in a minute.

Calculate the equivalent power if all this energy can be utilized ? $\left(g = 10m/s^2\right)$

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76. How is the power related to the speed at which a body can be lifted ? How many kilograms will a man working at the power of 100 W, be able to lift at constant speed of 1 m/s vertically ? $\left(g = 10m/s^2\right)$

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77. Define watt. Express kilowatt in terms of joule per second. A 150 kg car engine develops 500 W for each kg. What force does it exert in moving the car at a speed of 20 m/s ?

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78. Compare the power at which each of the following is moving upwards against the force of gravity ? $\left(giveng = 10m/s^2\right)$ a butterfly of mass 1.0g that flies upward at a rate of 0.5

ms^-1 and a 250 g squirrel climbing up on a tree at a rate of 0.5 m/s.

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79. 6 bulbs of 40w are used for 6 hours a day along with 1 bulb of 100w for 2 hours. Calculate units of energy consumed in 20 days

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80. A student lifts an object in the upward direction. In doing so, he applies the force on object in upward direction and displaces it in that direction. State the direction in which force of gravity is acting on it.

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81. A student lifts an object in the upward direction. In doing so, he applies the force on object in upward direction and displaces it in

that direction. Which one of these forces is doing positive work? Give reason.

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82. A student lifts an object in the upward direction. AIn doing so, he applies the force on object in upward direction and dipslaces it in that direction. Which one of the following is doing negative work? Give reason.

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83. An object of mass 'm' is moving with a constant velocity 'v'. How much work should be done on the object to bring it to rest?

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84. Given below are a few situations. Study them and state in which of the given cases work is said to be done. Give reasons for your answer. A person pushing hard a huge rock but the rock does not move.

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85. Given below are a few situations. Study them and state in which of the given cases work is said to be done. Give reasons for your answer. A bullock pulling cart upto 1 km on road.

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86. Given below are a few situations. Study them and state in which of the given cases

work is said to be done. Give reasons for your answer. A girl pulling a trolley for about 2m distance.

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87. Given below are a few situations. Study them and state in which of the given cases work is said to be done. Give reasons for your answer. A person standing with a heavy bag on his head.

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88. List two conditions which need to be satisfied for the work to be done on an object?

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89. 1 kWh = _____ J

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90. A body of mass 2 kg is thrown up at a velocity of 10 ms. Find the kinetic energy of the body of the time of throw. Also find the potential energy of the body at highest point.

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91. A body of mass 25 g has a momentum of 0.40 $kgms^{-1}$. Find its kinetic energy.

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92. For a force to do maximum work, what should be the angle between force and displacement vectors?

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93. State the physical quantity which will be affected by changing the rate of doing work.

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94. A coolie lifts a box of 15 kg from the ground the a height of 2m. Calculate the work done by the coolie on the box.

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95. when is the work done by a force negative.

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96. What is the difference between kW and kWh?

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97. A shotput player throws a shot put of mass 3 kg, If it crosses the top of a wall of 2m height at a speedof 4 m/s, Compute the total mechanical energy of shot put when it croses the wall.

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98. Compare the kinetic energies of two objects of masses 10 kg and 50 kg respectively but having same momentum.

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99. A motor pump rated 400 W operate for 2 min and 40 sec and in doing so, raises 200 kg of water of the top of a building. If g = 10m, calculate the height of the building.

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100. A force acting on a 10 kg mass changes its velocity form 54 km/h to 90 km/h. Calculatethe work done by the force.

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101. Five bulb each having 100w power are used for 4hrs, a heater having 1500w power is used 2 hrs and an electric iron of power 1000

w is used for 5 hrs for 30 days. Calculate the total energy consumed by them.

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102. Five bulb each having 100w power are used for 4hrs, a heater having 1500w power is used 2 hrs and an electric iron of power 1000 w is used for 5 hrs for 30 days. Calculate the total energy consumed by them.

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103. What is the apparent weight of a floating body?

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104. A ball is dropped from a height of 5m. Find the velocity of the ball just before it reaches the ground. Do you require the value of mass to find the velocity?

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105. A block of mass 5 kg is given a velocity of 5m/s and allowed to move on a rough horizontal surface. Find the work done by the frictional force before it comes to rest.

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106. Find the ratio of powers of the following two persons?

Person A does a work of 100 J in 5 seconds.(b) Person B does a work of 200J in 6 sec.

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107. Our hands become warm when rubbed against each other. Explain.

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108. Two bodies A and B have equal kinetic energies. If mass of A is greater than mass of B, then which body has more linear momentum.

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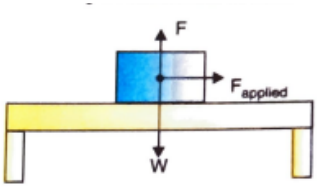
109. In the given figure, the block moves horizontally towards right. Which force(S) do work?



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110. Work done by the force for a horizontal dispalcement of 3 m in the given figure is

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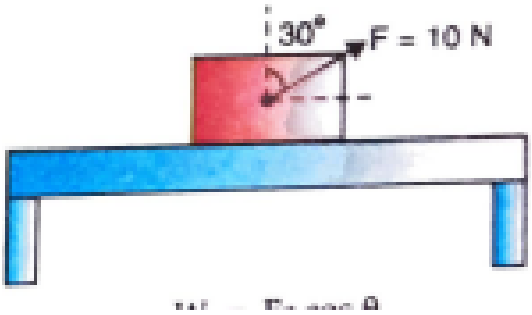

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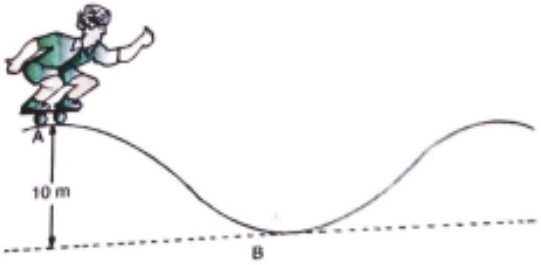
111. A skater of mass 50 kg moves down from A to B. The frictional forces are absent. What is the kinetic energy at B?



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112. Devender wasgoing to buy a tugsten filaent bulb. His son Raghav told not to buy that bulb. He suggest to buy a CFL. Which cosumes much lss power than the tungsten filament bulb. Divya also joined discussion and requested her dad to buy a LED bulb which did not create pollution as created by CFL a had much greater life span than CFL.

What is power?

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113. Devender wasgoing to buy a tugsten filaent bulb. His son Raghav told not to buy that bulb. He suggest to buy a CFL. Which cosumes much lss power than the tungsten filament bulb. Divya also joined discussion and requested her dad to buy a LED bulb which did not create pollution as created by CFL a had much greater life span than CFL.

Why tungsten filament bulb consumes more power?

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114. Devender wasgoing to buy a tugsten filaent bulb. His son Raghav told not to buy that bulb. He suggest to buy a CFL. Which cosumes much lss power than the tungsten filament bulb. Divya also joined discussion and requested her dad to buy a LED bulb which did not create pollution as created by CFL a had much greater life span than CFL.

What values were shown by Divya?

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115. Ramesh, sone of a wealthy farmer and a student of Class IX lived in a small village. One day he want on a educational trip where he saw solar cell panels used for street light. When he returned form the trip he shown this information with his father and requested him to instal a solar panel to light the backyard of their bones as it could save electricity bill. Name the energy transformation taking place in solar cell panel.

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116. Ramesh, sone of a wealthy farmer and a student of Class IX lived in a small village. One day he want on a educational trip where he saw solar cell panels used for street light. When he returned form the trip he shown this information with his father and requested him to instal a solar panel to light the backyard of their bones as it could save electricity bill. What type of material is used for making solar cell panel.

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117. Ramesh, sone of a wealthy farmer and a student of Class IX lived in a small village. One day he want on a educational trip where he saw solar cell panels used for street light. When he returned form the trip he shown this information with his father and requested him to instal a solar panel to light the backyard of their bones as it could save electricity bill. What values were displayed by Ramesh?

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Exercise

1. Does work has direction associated with it?

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2. For what value θ is work done maximum

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3. For what value θ is work done zero?

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4. When work is measured in J, force is measured in _____ and displacement is measured in _____.

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5. A person is walking on a horizontal road and carrying a briefcase. The work done by the person on the breifcase is _____

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6. Work done by centripetal force is zero . (T or F)

Watch Video Solution

7. A coolie moves on a horizontal platform with luggage on his head. The work done by coolie on the luggage is zero.

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8. Define work. Write its formula. What is the SI unit of work? Is it a scalar or a vector quantity?

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9. Give three situations in which a force produces displacement but still the work done by the force is zero.

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10. A horizontal force acts on a body placed on a smooth horizontal table . If the force applied is 10N,find the total work done when the displacement of body is 5m.

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11. A horizontal force of 20 N is required to keep a body moving in a horizontal direction with constant velocity. What is the work done by the coolie?

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12. Find the work done in lifting a 50 kg bucket a water through a vertical height of 2 m.

Watch Video Solution

13. Does kinetic energy of a body depend on the direction of motion of the object?

Watch Video Solution

14. When you are climbing stairs, work done by the weight is positive. (T or F).

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15. The ratio S.I unit to C.G.S. unit of work is _____.

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16. Can every force do work?

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17. When work is done on a body then kinetic energy of the body_____. (increases/decreases)

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18. A book falls freely from the table top. Is work done by some force during the fall?

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19. A boy sitting in a moving car possesses kinetic energy.

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20. If momentum of a body is doubled, the kinetic energy becomes _____ times.

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21. Is energy a scalar or a vector quantity? Why?

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22. What are the various forms of energy? Give some examples of each.

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23. Define Kinetic energy. Give one example.

Watch Video Solution

24. A boy of mass 18 kg is running with a speed of 12 km/h. Find the kinetic energy possessed by the boy.

Watch Video Solution

25. Given that the kinetic energy of an object is 100 J. If the mass of object is 2 kg then find its speed.

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26. A stationary football is kicked by a player such that it attains a speed of 3 m/s just after the kick. Find the work done by the player on the ball if the mass of the ball is 100 g.

Watch Video Solution

27. Find the work done in in reasing the speed of car from $18kmh^{-1}$ to $36kmh^{-1}$. Given, the mass of car is 1000 kg.

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28. What is the force required to lift a book of mass m? This force is required to overcome which force?

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29. What happens to the potential energy if the height of a body is doubled?

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30. Give two example of bodies possessing gravitational P.E.

Watch Video Solution

31. Give two example of bodies possessing elastic P.E.

Watch Video Solution

32. Define potential energy. Derive an expression for it. On what factors does gravitatoinal potential energy depends.

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33. A body of mass 6 kg is kept at a height of 5 m from the surface of earth. Find the potential energy of the body.

Watch Video Solution

34. The body of mass 6 kg is taken from a height of 5 m to a height of 10 m. Find the work done.

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35. An object of mass 12 kg is at a certain height above the ground. If the potential energy of the object is 480 J. Find the height at which the object is with respect to the ground. (Given g = 10m/s)

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36. A boy of mass 40 kg climbs vertically upwards on a coconut tree to a height of 10m. Calculate the work done by the boy.

Watch Video Solution

37. A boy of mass 40 kg climbs vertically upwards on a coconut tree to a height of 10m. Calculate the potential energy gained.

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38. In a solar cell panel, _____ energy is converted into _____ energy.

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39. In a micorphone, _____ energy is converted into_____ energy.

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40. The point of minimum kinetic energy in case of oscillating pendulum is _____ position. (extreme or mean).

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41. Graphically show the variation of potential energy of a freely falling body.

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42. During a free fall $K.E_1 + P.E_i + \ = K.E_f + \_\ \_\_\ \_\_$. Here I = initial and f = final.

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43. A body is thrown vertically upwards. During it srise the potential energy _____ and kinetic energy _____ (decreases, increases)

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44. Name five devices and the energy conversion that takes place in the devices.

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45. A 2 kg ball is dropped from a height of 1. Find its kinetic energy just before hitting ground.

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46. A body is thrown up with a kinetic energy 100 J. Find the potential energy at the topmost point.

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47. Find the height attained by the body when a bodyis thrown up with a kinetic energy of 100j and if mass of the body is 1 kg.

Watch Video Solution

48. What is the difference between kW and kWh?

Watch Video Solution

49. Work can the converted into energy (T or F)

Watch Video Solution

50. 1 kWh = _____ J

Watch Video Solution

51. The commercial unit of electricity in kWh , what is the value of 1kWh in joules ?

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52. Power is _____ of doing work with respect to time.

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53. 1 W.s = _____ J.

Watch Video Solution

54. What is the relationship between power force and velocity?

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55. If a lift can move a load of 5000 kg with a speed of $1ms^{-1}$, where is the power of the lift?

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56. If a man lifts a load up with the help of rope such that it raises the load of mass 50 kg to a height of 20 m in 100 seconds. Find the power of man. (Take$g = 10ms^{-2}$)`

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57. Find the time required to spent and energy of 100 J by a machine of power 10 W?

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58. kgm^2s^{-2} is the unit of

A. force

B. power

C. momentum

D. energy

Answer:

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59. 9800 J of energy was spend to raise a mass of 50 kg. The mass was raised to a height of

A. 20 m

B. 10 m

C. 980 m

D. none

Answer:

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60. 1 MeV (Mega electron Volt) is equal to

A. $1.6 \times 10^{13} J$

B. $1.6 \times 10^{19} J$

C. $1.6 \times 10^{-19} J$

D. $1.6 \times 10^{-13} J$

Answer:

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61. A body of mass 5 kg is dropped form a height o 1 m. Its kinetic energy just before reaching the ground is

A. 49 N

B. 98 N

C. 168 N

D. 28 N

Answer:

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62. A body is at rest. It may possess

A. energy

B. momentum

C. speed

D. velocity

Answer:

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63. The angle between force and dispalcement is θ. For what value of θ is work done zero

A. 30°

B. 45°

C. 180°

D. 90°

Answer:

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64. A coolie lifts a suitcase and walks form the plateform to an overhead bridge. The work done by the coolie is

A. zero

B. positive

C. negative

D. incomplete information

Answer:

65. 1 erg = _____ Joule

A. 10^7

B. 10^5

C. 10^{-7}

D. 10^{-5}

Answer:

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66. 1 J = _____ $\times$ 10 m

A. 1 s

B. 1 N

C. $10^{-1}s$

D. $10^{-1}N$

Answer:

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67. A centripetal force acts

A. radially inwards

B. radially outwards

C. tangentially

D. axially

Answer:

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68. Heat energy is present in a body in the form of

A. infra-red radiation

B. ultraviolet light

C. kinetic energy of constituent particles

D. none

Answer:

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69. When you compress a coil spring you do work on it the elastic potential energy

A. increases

B. decreases

C. disappears

D. remains unchanged

Answer:

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70. Potential energy of your body is minimum when you

A. are standing

B. are sitting on the chair

C. are sitting on the ground

D. lie down on the ground

Answer:

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71. Write an expression for the work done when a force is acting on an object in the direction of its displacement.

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72. Write an expression for the work done when a force is acting on an object in the direction of its displacement.

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73. What is electric energy? what is its SI unit?

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74. Which physical quantity has a unit electron volt (eV)?

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75. Which physical quantity has its unit kWh?

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76. Is energy a scalar or a vector quantity? Why?

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77. Define kinetic energy?

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78. What is mechanical energy?

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79. Name the kind of energy stored in a stretched bow.

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80. When the height of an object is increased, what happens to its potential energy?

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81. What type of energy conversion takes place in a thermal power plant?

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82. State the law of conservation of energy.

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83. What is the relationship between power force and velocity?

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84. Seema tried to push a heavy rock of 100 kg for 200s but could not move it. Find the work done by Seema at the end of 200s.

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85. At what speed of a body of mass 1 kg will have a kinetic energy of 1J?

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86. Identify energy possessed by rolling stone

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87. Identify energy possessed by running athelete.

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88. How much work is done by a weight lifter when he holds a weight of 80 kg on his shoulders for two minutes?

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89. A force of 10 N moves a body with a constatn speed of $2ms^{-1}$. Calculate the power of the body?

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90. A car and a truck are moving with the same velocity of $60kmh^{-1}$. Which one has more kinetic energy?

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91. What will be the kinetic energy of a body when its mass is made four times and the velocity is doubled?

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92. A body is thrown vertically upwards. Its velocity goes on decreasing. Write the change in kinetic energy when its velocity is zero.

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93. State the energy conversion in a dry cell.

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94. A coolie is walking on a railway platform with a load of 30 kg on his head. How much

work is done by coolie?

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95. What is the work done by earth in moving around the sun?

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96. When displacement is in a direction opposite to the direction of force applied, what is the type of work done?

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97. Define 1kWh.

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98. In an oscillating pendulum, at what positions are the potential and kinetic energy maximum.

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99. How many joules are present in 1 kilowatt hour?

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100. Name the term used for the sum of kinetic and potential energy of a body.

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101. What type of energy conversion takes place in a thermal power plant?

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102. If the heart works 60 joules in one minute. What is its power?

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103. State the value of commercial unit of electrical energy in joule.

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104. At what rate is electrical energy consumed in a 60 W bulb?

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105. Give an example of a body having potential energy due to change in shape?

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106. If the speed of the body is halved. What is the change in kinetic energy?

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107. Under what conditions is work said to be done?

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108. Write an expression for kinetic energy of an object. On what factors does the kinetic energy depend.

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109. Derive a relationship between kinetic energy and linear momentum.

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110. Two bodies of mass m_1 and $m_2(>m_1)$ have equal linear momentum. Which body possesses greater kinetic energy?

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111. Two bodies of mass m_1 and $m_2(>m_1)$ have equal kinetic energies. Which body possesses greater linear momentum.

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112. Give an example in which the following energy conversion takes place . Electrical energy to kinetic energy.

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113. Give an example in which the following energy conversion takes place. Chemical energy to electrical energy.

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114. Define power. What is its SI unit? Give a relationship between power, force and velocity?

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115. What type of energy is stored in the following cases?

A stretched rubber band.

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116. What type of energy is stored in the following cases?

A compressed spring.

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117. What type of energy is stored in the following cases?

An extended spring (or slinky)

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118. What type of energy is stored in the following cases?

An object at a certain height.

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119. What type of energy is stored in the following cases?

A stretched bow.

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120. How do green plants produce food? Where do they get their energy from?

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121. Why does air move from place to place?

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122. How are fuels such as coal and petroleum formed?

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123. The velocity of a body moving in a straight line is increased by applying a constant force

F, for some distance in the direction of the motion. Prove that the increase in the kinetic energy of the body is equal to the work done by the force on the body.

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124. Is it possible that a force is acting on a body but still work done is zero? Explain giving one example.

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125. Two bodies of equal masses move with uniform velocities v and 3v respectively. Find the ratio of their kinetic energies.

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126. Define 1 watt.

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127. An electric bulb of 60 W is used for 6 hours per day. Calculate the units of energy consumed in one day by the bulb.

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128. Define work. Give its SI and CGS unit. What is the relationship between these units?

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129. Give an example for force acting in the direction of displacement.

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130. Give an example for force acting against the direction of displacement.

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131. Deifne potential energy. On what factors does potential energy depends.

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132. A body is thrown vertically upwards with a speed u. When does its potential energy becomes maximum.

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133. A body is thrown vertically upwards with a speed u. When does kinetic energy becomes maximum.

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134. A body is thrown vertically upwards with a speed u. When does P.E. = K.E.

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135. Two girls, each of weight 400 N climb up a rope through a height of 8 m. We name one of the girls A and the other B. Girl A takes 20 s while B takes 50 s to accomplish this task. What is the power expended by each girl?

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136. A mass of 10 kg is dropped form a height of 50 cm. Find its potential energy just before dropping.

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137. A mass of 10 kg is dropped form a height of 50 cm. Find its kinetic energy just on touching the ground.

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138. A mass of 10 kg is dropped form a height of 50 cm. Find its velocity with which it hits the ground.

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139. A ball of mass 0.5 kg slows down from a speed of $5ms^{-1}$ to $3ms^{-1}$, calculate the change in the kinetic energy of the ball.

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140. Which would have greater effect on the kinetic energy of an object-doubling the mass of doubling the velocity.

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141. Name the energy transformation taking place in the following devices:

a radio

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142. How much the work is done, when earth moves around the sun in its orbit.

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143. A 5 kg ball is thrown upwards with a speed of $10ms^{-1}(g = 10ms^{-2})$

Calculate the maximum height attained by it.

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144. A 5 kg ball is thrown upwards with a speed of $10ms^{-1}(g = 10ms^{-2})$

Find the potential energy when it reaches the highest point.

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145. Calculate the electricity bill amount for a month of April, if 4 bulbs of 40 W for 5 h, 4 tubelights of 60 W for 5 h, a TV of 100 W for 6 h, a washing machine of 400 W for 3 h are used per day. The cost per unit is Rs 1.80.

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146. An object is made to fall from different heights 20 cm, 40 cm and 60 cm on a wet

sand.

What do you observe on the sand?

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147. An object is made to fall from different heights 20 cm, 40 cm and 60 cm on a wet sand.

Explain the reasons of your observation.

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148. Define power. A boy of mass 45 kg climbs up 20 steps in 20 sec. it each step is 25 cm high, calculate the power of the boy used in climbing.

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149. A truck and a car are running with same velocity. Which of the tow has less kinetic energy?

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150. Give an example of electrical energy converted into light energy.

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151. What are two types of potential energy? Give two examples of each.

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152. Define K.E. and derive the expression for K.E.

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153. The kinetic energy of a body of mass 15 kg is 30 J . What is its momentum

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154. An object of mass 15 kg moving with a uniform velocity of $4ms^{-1}$. What is the kinetic energy possessed by the object?

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155. What is the work to be done to increase the velocity of a car form $30kmh^{-1}$ to $60kmh^{-1}$ if the mass of car is 1500 kg?

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156. Find the energy possessed by an object of mass 10 kg when it is at a height of 6m above the ground

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157. A boy of mass 50 kg runs up a staricase of 45 steps in 9 s. If the height of each step is 15 cm, find his power.

Watch Video Solution

158. An electric bulb of 60 W is used for 6 hours per day. Calculate the units of energy consumed in one day by the bulb.

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159. A ball is dropped a height h. The velocity of the ball when it reaches the ground is $10ms^{-1}$. Find h.

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160. When a body falls freely towards the earth, then its total energy.

A. increases

B. decreases

C. remains constant

D. first increases and then decreases

Answer:

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161. A car is accelerated on a levelled road and attains a velocity 4 times of its initial velocity. In this process the potential energy of the car

A. does not change

B. becomes twice to that initial

C. becomes 4 times that of initial

D. becomes 16 times that of initial

Answer:

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162. In case of negative work the angle between the force and displacement is

A. 0°

B. 45°

C. 90°

D. 180°

Answer:

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163. A girl is carrying a school bag of 3 kg mass on her back and moves 200 m on a levelled road. The work done against the gravitational force will be

A. $6 \times 10^3 j$

B. 6j

C. 0.6 j

D. zero

Answer:

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164. Which one of the following is not the unit of energy?

A. joule

B. newton metre

C. kilowatt

D. kilowatt hour

Answer:

Watch Video Solution

165. The work done on a object does not depend upon the

A. displacement

B. force applied

C. angle between force and displacement

D. intial velocity of the object

Answer:

Watch Video Solution

166. Water stored in a dam possesses

A. no energy

B. electrical energy

C. kinetic energy

D. potential energy

Answer:

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167. A body is falling from a height h. After it has fallen a height $\frac{h}{2}$, it will possess

A. only potential energy

B. only kinetic energy

C. half potential and half kinetic energy

D. more kinetic and less potential energy

Answer:

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168. Two electrodes are maintaned at a potential difference of 100 V. An elecron moving form cathode to anode gains kinetic energy

A. 160×10^{-19}Erg

B. 100 Joule

C. 160×10^{-19}Joule

D. 100 Erg

Answer:

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169. A car with K.E. 100 J is moving on a horizontal road. Now 200 J work is done on the car. The change in K.E. is

A. Zero

B. 100 J

C. 200 J

D. 300 J

Answer:

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170. Two bodies with kinetic energy in the ratio of 4:1 are moving with equal linear momentum. The ratio of their masses is

A. $1:2$

B. $1:1$

C. $4:1$

D. $1:4$

Answer:

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171. A certain household has consumed 250 units of electric energy during a month.How much energy is this in joules ?

A. 3.6×10^{10}

B. $7.2x10^{10}$

C. 3.6×10^{8}

D. $7.2x10^{8}$

Answer:

Watch Video Solution

172. If mass is doubled and velocity is halved then new kinetic energy is

A. halved

B. twice

C. four times

D. six times

Answer:

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173. When the force retards the motion of the body, the work done is :

A. zero

B. negative

C. positive

D. postive or negative depending upon the magnitude of force and displacement.

Answer:

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174. In which of the following examples, work done is negative?

A. Work done by the force of gravity on a movemet aeroplane

B. Work done by the force of gravity on a thrown upwards.

C. Work done by the force of gravity on a freesh falling object

D. Work done by the force of gravity on a satellite revolving around the earth.

Answer:

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175. In which of the following applications is work is not done?

A. Shopping in the supermarket

B. Standing with a basket of fruit on the head

C. Climbing a tree to pluck

D. Pushing a wheelbarrow of bricks.

Answer:

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176. For a force to do maximum work, what should be the angle between force and displacement vectors?

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177. State the SI unit of potential energy.

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178. What is the commercial unit of electical energy? Represent it in terms of joules.

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179. A boy throws a rubber ball vertically upwards. What kind of work is done. By the force applied by the boy. Support your answer with reason.

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180. A boy throws a rubber ball vertically upwards. What kind of work is done. By the gravitational force? Support your answer with reason.

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181. A person holds a bundle of hay over his head for 30 minutes and gets tired. Has he done some work or not,? Justify your answer.

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182. Express kilowatt hour in terms of joules.

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183. Two children A and B each weigh 20 kg climb a rope up a height of 10 m. The child A takes 10 s, and child B take 20s, to climb. State whether the work performed by both the children is equal or different.

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184. Two children A and B each weigh 20 kg climb a rope up a height of 10 m. The child A takes 10 s, and child B take 20s, to climb. Out

of these two children, who has more power? Compare their powers.

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185. In a house 3 bulb of 25 W. Each are used for 5 hours a day. Calculate units of electricity consumed in a month a 31 days. Also, find the total expenditure if 1 unit of electricty costs Rs. 2.50

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186. State the law of conservation of energy. Show that the energy of a freely falling body is conserved.

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187. The work done on a object does not depend upon the

A. force applied

B. initial velocity of the object

C. displacement

D. angle between force and displacement

Answer:

Watch Video Solution

188. In case of negative work the angle between the force and displacement is

A. 0°

B. 45°

C. 90°

D. 180°

Answer:

Watch Video Solution

189. Water stored in a dam possesses

A. K.E.

B. P.E.

C. Electric energy

D. No energy

Answer:

Watch Video Solution

190. Which one of the following is not the unit of energy?

A. Joule

B. newton metre

C. kWh

D. kW

Answer:

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191. Two boys A and B do equal work. They will have equal power if

A. time taken by boy A to do the work is more than the time taken by the boy B

B. time taken by boy A to do the work is less than the time taken by the boy B

C. time taken by both boys is equal

D. power is independent of the time taken to do work.

Answer:

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