11.   Work and Energy

Q 1 What is energy of a body?

Mark (1)

Q 2 Define kinetic energy.

Mark (1)

Q 3 What is potential energy?

Mark (1)

Q 4 What will be the work done by a force if displacement of the body is zero?

Mark (1)

Q 5 When is work done on a body positive?

Mark (1)

Q 6 Can energy be converted from one form to another?

Mark (1)

Q 7 Define power.

Mark (1)

Q 8 What will be the new kinetic energy of a body if its velocity is doubled?

Mark (1)

Q 9 What will be the potential energy of an object of mass 5 kg kept at a height of 10 metres from the ground? Take $g = 10$ m/s^2.

Mark (1)

Q 10 A green plant is carrying out photosynthesis. What is the work done in this process?

Mark (1)

Q 11 What is mechanical energy of an object?

Mark (1)

Q 12 How we can define one watt?

Mark (1)

Q 13 Give a mathematical expression for the work done when a force is acting on an object in the direction of its displacement.

Mark (1)

Q 14 How average power can be calculated?

Mark (1)

Q 15 When a ball is thrown in upward direction, work is done by the force of gravity. When a ball comes down freely towards the earth, in this case too work is done by the force of gravity. What is the difference in the nature of work done in the two cases?

Marks (2)

Q 16 What is the energy change involved when a battery lights a bulb?

Marks (2)

Q 17 A constant force of 10N displaces a body through 5 m. Find the work done by the force.

Marks (2)

Q 18 What will be the work done if a stone of mass 2 kg is raised through a height of 10cm?(take $g=10m/s^2$)

Marks (2)

Q 19 What are the conditions needed for work to be done?

Marks (2)

Q 20 An electric bulb of 60W is used for 5 hours a day. Calculate the energy consumed in one day by it.

Marks (2)

Q 21 An object of mass 10kg is moving with a speed of 4 m/s. What is the kinetic energy of the object?

Marks (2)

Q 22 An object of mass 10kg is at a certain height above the ground. If the potential energy of the object is 200J , find the height of the object from the ground?

Marks (2)

Q 23 A person is holding a heavy bag on his head for 20 minutes and gets tired. Has he done some work or not? Explain.

Marks (2)

Q 24 If a particle falls through a height; its potential energy decreases. Does this violate the law of conservation of energy? Explain why?

Marks (2)

Q 25 What is the work done by the force of gravity on a satellite moving round the earth?

Marks (2)

Q 26 An artificial satellite orbiting the earth in very thin atmosphere loses its energy gradually due to dissipation against atmospheric resistance, however small. So, its speed should be decreased, but actually its speed increases progressively as it comes closer and closer to the earth. Why?

Marks (3)

Q 27 Ashish's mother carried two suitcases of total weight 200N to three stairs at a height of 10m and then pushes it with a constant speed to a distance of 35m by applying a horizontal force of 50N. How much work does Ashish's mother do on the suitcases during the entire motion?

Marks (3)

Q 28 A ball of mass 2kg is kept on a tower of height 30m. Find its potential energy at this point. If it is allowed to fall freely, find its kinetic energy when it just touches the ground?

Marks (3)

Q 29 A body of mass5 kg is kept on a table. If it is displaced by a force of 10N by 2 m on the table on the same horizontal line, find the work done by the gravitational force.

Marks (3)

Q 30 What is law of conservation of energy?

Marks (3)

Q 31 A man of mass 50kg climbs a tower of height 45m in 5 seconds with the help of a rope. Find the power of the man?

Marks (3)

Q 32 What will be the work done to stop a moving cycle of mass 30kg which is moving with speed 54km/hr ?

Marks (3)

Q 33 A freely falling body stops when it hits the ground. What happens to its kinetic energy?

Marks (3)

Q 34 Discuss the energy changes that take place in an oscillating pendulum. Why does the pendulum come to rest? What happens to its energy after it stops oscillating?

Marks (3)

Q 35 A bulb is lighted when it is connected to the battery. Explain the energy changes that take place in the process.

Marks (3)

Q 36 A car of mass 500kg accelerates uniformly from rest to a velocity of 36km/h in 10 seconds. What is the acceleration, gain in kinetic energy and average power of the engine during this period, if friction is neglected?

Marks (3)

Q 37 A vehicle weighing 800 kg and travelling with 40 m/s is decelerated uniformly and comes to rest after covering a distance of 50 m. What is the force exerted on it by the brakes? What is the work done by the brakes?

Marks (5)

Q 38 If in an office, 10 tubes of 40W, 5 fans of 75W and 2 ACs of 1500W are used for 8 hours a day. Calculate the energy consumed per day in commercial units of energy.

Marks (5)

Q 39 Prove that the kinetic energy of a body moving with speed v is equal to $(1/2)mv^2$.

Marks (5)

Q 40 What will be the work done to increase the speed of a bike from 18km/h to 54 km/hr if the mass of the car is 100kg?

Marks (5)

Q 41 Define power. What is the SI unit of power? An electric device consumes 21.6 J of electrical energy in 4 minutes and the other electrical device consumes 35.4 J of energy in 6 minutes. Which device has more power?

Marks (5)

Q 42 What is the law of conservation of energy? Give two daily life
examples of law of conservation of energy.
A ball of mass 4 kg is thrown vertically upwards with a velocity 20 m/s. Find its kinetic energy, potential energy and total energy at a point 15 m above the ground.

Marks (5)

Q 43 An object of mass 100 kg is raised to a height of 10 m above the ground. What is the potential energy of the object at this height? If the object is allowed to fall freely, what will be its kinetic energy after falling a distance of 4 metres? (Take g = 10 m/s^2)

Marks (5)

Q 44 A car of mass 2500 kg is lifted up a distance of 50 m by a crane in 2 minutes. Another crane can lift the same car up to the same height in 3 minutes. What is the power applied by each crane? Do the cranes consume the same or different amount of fuel? Neglect power dissipation against friction.

Marks (5)

Q 45 Define energy. Name the physical quantity that has same unit as that of energy. Four electrical appliances, each rated 500 W, run for 10 hours. Calculate the energy in kWh and joules.

Marks (5)

Q 46 Define kinetic energy. What is the kinetic energy of an object of mass 'm' moving with velocity? Also, calculate the work done on a bicycle of mass 20 kg to increase its speed from 2 ms^{-1} to 3 ms^{-1}.

Marks (5)

Most Important Questions

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