

Work, Energy and Power

Question 1.

When a force of 50 N acts on a body, the body is displaced through a distance of 3 m in a direction normal to the direction of the force. The work done by the force

- (a) 150 J
- (b) 1470 J
- (c) Zero
- (d) -150 J

▼ Answer

Answer: (c) Zero

Question 2.

A body of mass 20 kg is initially at a height of 3 m above the ground. It is lifted to a height of 2 m from that position. Its increase in potential energy is

- (a) 100 J
- (b) 392 J
- (c) 60 J
- (d) -100 J

▼ Answer

Answer: (b) 392 J

Question 3.

A wooden cube having mass 10 kg is dropped from the top of a building. After 1 s, a bullet of mass 20 g fired at it from the ground hits the block with a velocity of 1000 m/s at an angle of 30° to the horizontal moving upwards and gets imbedded in the block. The velocity of the block/bullet system immediately after the collision is

- (a) 17 m/s
- (b) 27 m/s
- (c) 52 m/s
- (d) 10 m/s

▼ Answer

Answer: (a) 17 m/s

Question 4.

A body of mass 10 kg is moved parallel to the ground, through a distance of 2 m. The work done against gravitational force is

- (a) 196 J
- (b) -196 J
- (c) 20 J
- (d) zero

▼ Answer

Answer: (d) zero

Question 5.

A quantity of work of 1000 J is done in 2 seconds. The power utilised is

- (a) 998 W

- (b) 1002 W
- (c) 2000 W
- (d) 500 W

▼ Answer

Answer: (d) 500 W

Question 6.

A body of mass 1 kg travels with a velocity of 10 m/s, this a wall and rebounds. If 50% of its initial energy is wasted as heat, its kinetic energy at the instant of rebounding is

- (a) 20 J
- (b) 60 J
- (c) 50 J
- (d) 25 J

▼ Answer

Answer: (d) 25 J

Question 7.

A marble moving with some velocity collides perfectly elastically head-on with another marble at rest having mass 1.5 times the mass of the colliding marble. The percentage of kinetic energy by the colliding marble after the collision is

- (a) 4
- (b) 25
- (c) 44
- (d) 67

▼ Answer

Answer: (a) 4

Question 8.

A particle of mass m is moving in a horizontal circle of radius r under a centripetal force given by $(-kr^2)$ where k is a constant, then

- (a) the total energy of the particle is $(-k/2r)$
- (b) the kinetic energy of the particle is (k/r)
- (c) the potential energy of the particle is $(k/2r)$
- (d) the kinetic energy of the particle is $(-k/r)$

▼ Answer

Answer: (a) the total energy of the particle is $(-k/2r)$

Question 9.

A sphere of mass m moving with a constant velocity u hits another stationary sphere of the same mass. If e is the coefficient of restitution, then the ratio of velocity of the two spheres after the collision will be

- (a) $1 - e / 1 + e$
- (b) $1 + e / 1 - e$
- (c) $e + 1 / e - 1$
- (d) $e - 1 / e + 1$

▼ Answer

Answer: (a) $1 - e / 1 + e$

Question 10.

Two masses 1 g and 4 g are moving with equal kinetic energies. The ratio of the magnitudes of their linear momenta is

- (a) 4 : 1
- (b) 0 : 1
- (c) 1 : 2
- (d) 1 : 6

▼ [Answer](#)

Answer: (c) 1 : 2

Question 11.

A ball is dropped from a height of 1 m. If the coefficient of restitution between the surface and ball is 0.6, the ball rebounds to a height of

- (a) 0.6 m
- (b) 0.4 m
- (c) 1 m
- (d) 0.36 m

▼ [Answer](#)

Answer: (d) 0.36 m

Question 12.

A wooden cube having mass 10 kg is dropped from the top of a building. After 1 s, a bullet of mass 20 g fired at it from the ground hits the block with a velocity of 1000 m/s at an angle of 30° to the horizontal moving upwards and gets imbedded in the block. The velocity of the block/bullet system immediately after the collision is

- (a) 17 m/s
- (b) 27 m/s
- (c) 52 m/s
- (d) 10 m/s

▼ [Answer](#)

Answer: (a) 17 m/s

Question 13.

A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further will it penetrate before coming to rest assuming that it faces constant resistance to motion?

- (a) 2.0 cm
- (b) 3.0 cm
- (c) 1.0 cm
- (d) 1.5 cm

▼ [Answer](#)

Answer: (c) 1.0 cm

Question 14.

A body of mass 5 kg is initially at a height of 10 m above the ground. It is then moved to another place 40 m from this position in the same horizontal level. Its increase in potential energy is

- (a) 200 J
- (b) 1960 J

- (c) Zero
- (d) -200 J

▼ Answer

Answer: (c) Zero

Question 15.

A body of mass 20 kg falls through a vertical height of 3 m. The work done by the gravitational force is

- (a) -588 J
- (b) 588 J
- (c) 60 J
- (d) -60 J

▼ Answer

Answer: (b) 588 J

Question 16.

A body of mass 1 kg travels with a velocity of 10 m/s, hits a wall and rebounds. If 50% of its initial energy is wasted as heat, its kinetic energy at the instant of rebounding is

- (a) 20 J
- (b) 60 J
- (c) 50 J
- (d) 25 J

▼ Answer

Answer: (d) 25 J

Question 17.

An electric heater of rating 1000 W is used for 5 hrs per day for 20 days. The electrical energy utilised is

- (a) 150 kWh
- (b) 200 kWh
- (c) 100 kWh
- (d) 300 kWh

▼ Answer

Answer: (c) 100 kWh

Question 18.

A body of mass 20 kg falls vertically through a height of 10 m. Its loss of potential energy is

- (a) 300 J
- (b) 4000 J
- (c) 1000 J
- (d) 1960 J

▼ Answer

Answer: (d) 1960 J

Question 19.

A body of mass 10 kg is travelling with uniform speed of 5 m/s. Its kinetic energy is

- (a) 25 J

- (b) 125 J
- (c) 1250 J
- (d) 1000 J

▼ [Answer](#)

Answer: (b) 125 J

Question 20.

A quantity of work of 1000 J is done in 2 seconds. The power utilised is

- (a) 998 W
- (b) 1002 W
- (c) 2000 W
- (d) 500 W

▼ [Answer](#)

Answer: (d) 500 W

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