Educonclave

1. A pair of bullocks exert a force of $1500N$ on a plough. The field being ploughed is $20m$ long. The work done in ploughing the given length of the field will be

    (a) $21,000J$ (b) $30,000J$ (c) $45,000J$ (d) $3,000J$.

2. Which of the following statements is true about work done?

    (i)   Work done by a force is always positive.

    (ii) SI unit of work is joule.

    (iii) Work has both, magnitude and direction.

    (iv) Work is said to be done if an object is displaced when a force acts on it.

   (a) (i) and (ii)   (b) (ii) and (iii)   (c) (ii) and (iv)   (d) (i), (ii), (iii) and (iv)

3. A man carrying a bucket of water and walking on a rough level road with a uniform velocity does no work while carrying the bucket. Which of the following statements gives the correct reason for this?

    (a) The displacement of the bucket is zero.

    (b) There is no force acting on the bucket.

    (c) The displacement of the bucket is in the direction of force applied.

    (d) There is no displacement in the direction of the force applied.

4. A coolie lifts a luggage of $10kg$ from the ground and put it on his head $1.8m$ above the ground. The work done by him on the luggage is

    (a) $180J$ (b) $220J$ (c) $100J$ (d) $480J$.

5. A person pulls a body on a horizontal surface by applying a force of $5.0N$. Find the work done by this force in displacing the body through $2.0m$.

    (a) $10J$ (b) $15J$ (c) zero   (d) $5J$

6. A ball of mass $1kg$ thrown upwards reaches a maximum height of $5.0m$. Calculate the work done by the force of gravity during this vertical displacement.

    (a) $-49J$ (b) $49J$ (c) $5.0N$ (d) $-5.0N$

7. The speed of a motor bike decreases by 4 times. Its kinetic energy will decrease by

    (a) four times   (b) eight times   (c) sixteen times   (d) thirty two times.

8. Which of the following is not an example of potential energy?

    (a) Water stored in a dam.   (b) A stretched bow and arrow system.

    (c) A dog chasing a hare.   (d) A stone lying on the top of a roof.

9. Potential energy of a person is maximum when

    (a) person is sitting on a chair   (b) person is standing

    (c) person is lying on the ground   (d) person is sitting on the ground.

10. When the momentum of a body is increased by 100%, its K.E. increases by

    (a) 100% (b) 200% (c) 300% (d) 400%.

11. Which of the following graphs best represents the total energy (T) of a freely falling body versus its height (h) above the ground?

(a)   (b)   (c)   (d)
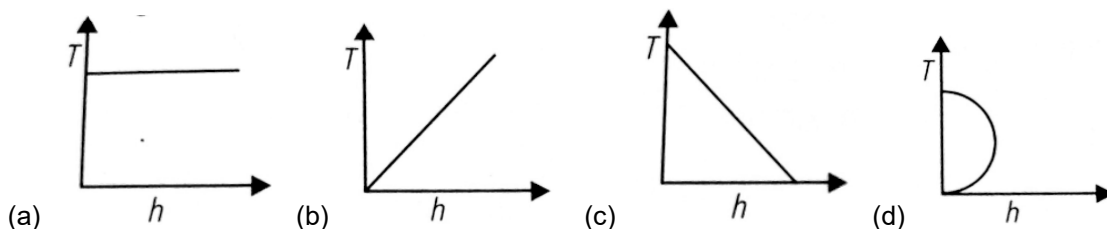
12. Which of the following graphs best represents the kinetic energy (K.E.) of a freely falling body versus its height h above the ground?


(a) (b)

(c) (d)
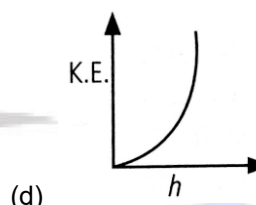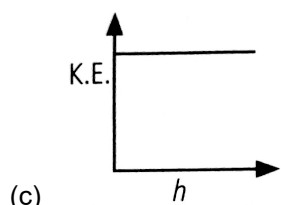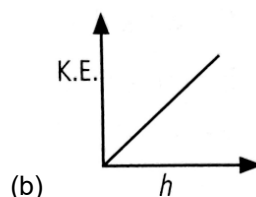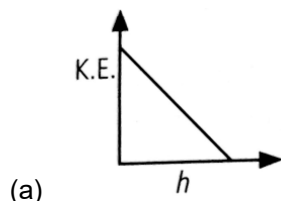
13. A cricket ball is projected vertically upward such that it returns back to the thrower. The variation in kinetic energy with time is best represented by


(a) (b) (c) (d)
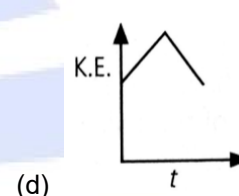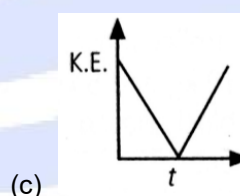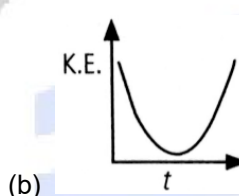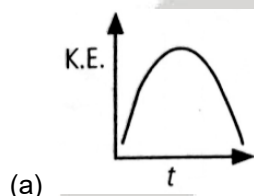
14. A rocket rises up vertically. What happens to its potential energy?

(a) It increases. (b) It initially increases then decreases.

(c) It initially decreases then increases. (d) It increases, till it becomes maximum.

15. A block is raised from position A to B by taking two different paths as shown in the figure given below. If $AB = h$, then
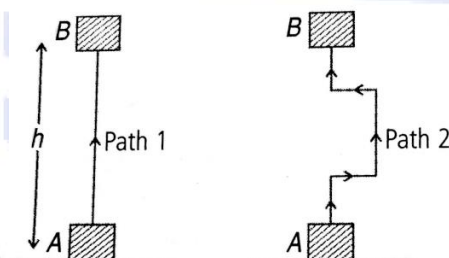
(a) the work done on the block is greater in case of path 1 than in case of path 2

(b) the work done on the block is greater in case of path 2 than in case of path 1

(c) the work done on the block is same for both paths

(d) the work done cannot be determined.

16. There are 3 paths leading to the top of the hill as show Assuming that the friction of the ground is negligible which of the following statements is true?


Path A (10 m)

Path B (7 m)

Path C (12 m)
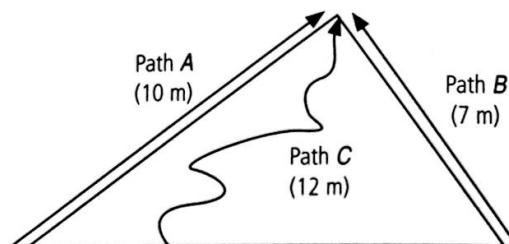
(a) All three paths require the same amount of energy to reach the top.

(b) Path B requires the least energy to reach the top.

(c) Path C requires most energy to reach the top.

(d) Path B requires more energy than path A to reach the top.

17. Which of the following best describes the useful energy change that takes place inside a mobile phone when sound is being produced?

(a) Electrical energy $\rightarrow$ Sound energy

(b) Chemical $\rightarrow$ Electrical energy $\rightarrow$ Heat energy

(c) Chemical energy $\rightarrow$ Heat energy $\rightarrow$ Electrical energy $\rightarrow$ Sound energy

(d) Chemical energy $\rightarrow$ Electrical energy $\rightarrow$ Sound energy

18. A mass hangs on a string fixed at point P. It starts from position 1 and swings to the furthest position on the opposite side, position 2. It then oscillates several times with decreasing amplitude before ending at position 3.
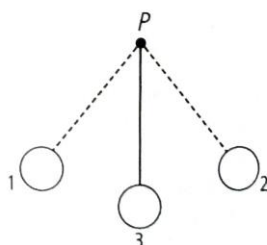

Where does the ball have the maximum kinetic energy?

(a) At position 1   (b) At position 2

(c) The first time at position 3   (d) The last time at position 3

19. A young child holds a ball over the edge of a balcony. He gently releases the ball, the ball fall on to a concrete floor and bounces back up.
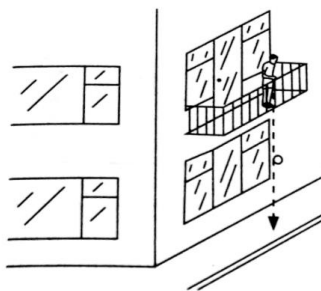
Which sequence represents, in the correct order, the transformations of the gravitational potential energy after the ball is released?

(a) $\rightarrow$ Elastic potential energy $\rightarrow$ Kinetic energy $\rightarrow$ Chemical potential energy

(b) $\rightarrow$ Elastic potential energy $\rightarrow$ Kinetic energy $\rightarrow$ Elastic potential energy

(c) $\rightarrow$ Kinetic energy $\rightarrow$ Elastic potential energy $\rightarrow$ Kinetic energy

(d) $\rightarrow$ Kinetic energy $\rightarrow$ Gravitational potential energy $\rightarrow$ Elastic potential energy

20. Power of a moving body is expressed in terms of

(a) work and distance   (b) force and distance   (c) force and velocity   (d) force and time.

21. A steam engine has an efficiency of 20%. It is given an energy of $1000\,cal$ per min. What is the actual work done by it in calories and in joule?

(a) $100\,cal, 800\,J$ (b) $200\,cal, 840\,J$ (c) $10\,cal, 80\,J$ (d) $100\,cal, 100\,J$

C-9, Greater Kailash Enclave 2, New Delhi; Phone: 9810815644, 9910393669
Email: info.educonclave@gmail.com; sangeettuli@gmail.com

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22. Two boys A and B lift 100 bricks through the same height.
If 5 minutes and 6 minutes respectively. Then
(a) A has more power than B
(b) B has more power than A
(c) both have same power
(d) data insufficient.

23. A man exerts a 80N force on a load of mass 6kg along a rough surface. The frictional force acting on the load is 20N.

mass = 6 kg
20 N   80 N
5 m
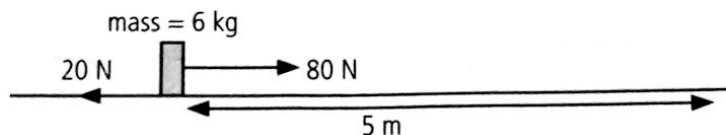
Given that the mass moves 5m horizontally in 30s, what is the useful power developed by the man?
(a) 10W   (b) 13W   (c) 78W   (d) 300W

24. 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.

25. In case of negative work the angle between the force and displacement is
(a) $0°$ (b) $45°$ (c) $90°$ (d) $180°$.

26. A girl is carrying a school bag of 3kg mass on her back and moves 200m on a levelled road. The work done against the gravitational force will be ($g = 10ms^{-2}$)
(a) 6×10^3 J   (b) 6J   (c) 0.6J   (d) zero.

27. Water stored in a dam possesses
(a) no energy   (b) electrical energy   (c) kinetic energy   (d) potential energy.

Assertion-Reason Codes:
(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.

28. Assertion: When the force retards the motion of a body, the work done is negative.
Reason: Work done depends on angle between force and displacement.

29. Assertion: A winded toy car, when placed on floor, starts moving.
Reason: Toy car has kinetic energy stored in it which facilitates its motion.

30. Assertion: Work done by or against gravitational force in moving a body from one point to another is independent of the actual path followed between the two points.
Reason: Gravitational forces are conservative forces.

31. Assertion: A crane P lifts a car up to a certain height in 1min. Another crane Q lifts the same car up to the same height in 2min. Then crane P consumes two times more fuel than crane Q.
Reason: Crane P supplies two times more power than crane Q.

32. Assertion: Watt hour has units of energy.
Reason: Kilowatt hour (kWh) is the unit of electric power.

33. Assertion: Work done by the gravitational force through a certain distance is constant irrespective of the fact that the body has a uniform or accelerated motion.
Reason: Gravitational force is a conservative force.

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Email: info.educonclave@gmail.com; sangeettuli@gmail.com

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