# WORK , ENERGY & POWER & CIRCULAR MOTION -LEVEL 1

SELECT THE CORRECT ALTERNATIVE (ONLY ONE CORRECT ANSWER)

1. A person A of 50 kg rests on a swing of length 1m making an angle $37^{O}$ with the vertical. Another person B pushes him to swing on other side at $53^{O}$ with vertical. The work done by person B is : [ $g = 10\ m/s^2$ ]

(A) 50 J (B) 9.8 J (C) 100 J (D) 10 J

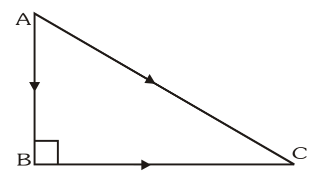
2. The work done by the frictional force on a pencil in drawing a complete circle of radius $r = 1/\pi$ metre on the surface by a pencil of negligible mass with a normal pressing force N = 5 N ($\mu = 0.5$) is :

(A) + 4J (B) –3 J (C) – 2 J (D) – 5J

3. A rope is used to lower vertically a block of mass M by a distance x with a constant downward acceleration g/2. The work done by the rope on the block is :

(A) Mgx (B) $\frac{1}{2}$Mgx (C) $-\frac{1}{2}$Mgx (D) Mgx

4. The work done in moving a particle under the effect of a conservative force, from position A to B is 3 joule and from B to C is 4 joule. The work done in moving the particle from A to C is :

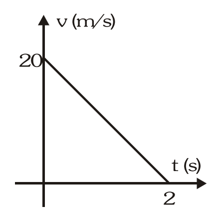



(A) 5 joule
(B) 7 joule
(C) 1 joule
(D) –1 joule

5. Work done in time t on a body of mass m which is accelerated from rest to a speed v in time $t_1$ as a function of time t is given by :

(A) $\frac{1}{2}m\frac{v}{t_1}t^2$ (B) $m\frac{v}{t_1}t^2$ (C) $\frac{1}{2}\left(\frac{mv}{t_1}t\right)^2 t^2$ (D) $\frac{1}{2}m\frac{v^2}{t_1^2}t^2$

6. Velocity–time graph of a particle of mass 2 kg moving in a straight line is as shown in figure. Work done by all the forces on the particle is :




(A) 400 J (B) –400 J
(C) –200 J (D) 200 J

7. A particle moves on a rough horizontal ground with some initial velocity say $v_0$. If $\frac{3}{4}$ of its kinetic energy is lost due to friction in time $t_0$ then coefficient of friction between the particle and the ground is :

(A) $\frac{v_0}{2gt_0}$ (B) $\frac{v_0}{4gt_0}$ (C) $\frac{3v_0}{4gt_0}$ (D) $\frac{v_0}{gt_0}$

8. A block of mass m moving with speed v compresses a spring through distance x before its speed is halved. What is the value of spring constant ?

(A) $\frac{3mv^2}{4x^2}$ (B) $\frac{mv^2}{4x^2}$ (C) $\frac{mv^2}{2x^2}$ (D) $\frac{2mv^2}{x^2}$

9. An engine can pull 4 coaches at a maximum speed of 20 m/s. Mass of the engine is twice the mass of every coach. Assuming resistive forces proportional to the weight, approximate maximum speeds of the engine when it pulls 12 and 6 coaches are :

(A) 8.5 m/s and 15 m/s respectively (B) 6.5 m/s and 8 m/s respectively
(C) 8.5 m/s and 13 m/s respectively (D) 10.5 m/s and 15 m/s respectively

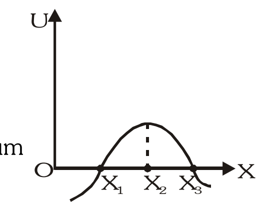
10 A small sphere starts falling from a very large height and after falling a distance of 100 m it attains the terminal velocity and continues to fall with this velocity. The work done by the atmosphere during the first fall of 100m is :
(A) Greater than the work done for next fall of 100 m
(B) Less than the work done for next fall of 100 m
(C) Equal to 100 mg
(D) Greater than 100 mg

11 A force acts on a 3 gm particle in such a way that the position of the particle as a function of time is given by $x = 3t - 4t^2 + t^3$, where x is in meters and t is in seconds. The work done during the first 4 second is :
(A) 384 mJ (B) 168 mJ (C) 528 mJ (D) 541 mJ

12. A body is moved along a straight line by a machine delivering constant power. The distance moved by the body in time t is proportional to :
(A) $t^{1/2}$ (B) $t^{3/4}$ (C) $t^{3/2}$ (D) $t^2$

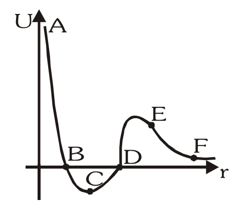
13. A particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration $a_C$ is varying with time t as $a_C = k^2rt^2$, where k is a constant. The power delivered to the particle by the force acting on it is :
(A) $2\pi mk^2r^2$ (B) $mk^2r^2t$ (C) $\frac{(mk^4r^2t^5)}{3}$ (D) zero

14. In the figure shown the potential energy (U) of a particle is plotted against its position 'x' from origin. Then which of the following statement is correct. A particle at :




(A) $x_1$ is in stable equilibrium (B) $x_2$ is in stable equilibrium
(C) $x_3$ is in stable equilibrium (D) None of these

15. The given plot shows the variation, the potential energy (U) of interaction between two particles with the separating distance (r) between them. Which of the above statements are correct ?

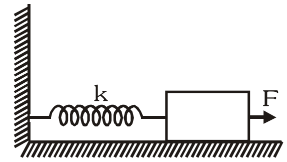



(1) B and D are equilibrium points
(2) C is a point of stable equilibrium points
(3) The force of interaction between the two particles is attractive between points C and D and repulsive between points D and E on the curve.
(4) The force of interaction between the particles is repulsive between points E and F on the curve.
(A) 1 and 3 (B) 1 and 4 (C) 2 and 4 (D) 2 and 3

16. A weight is hung freely from the end of a spring. A boy then slowly pushes the weight upwards until the spring becomes slack. The gain in gravitational poetential energy of the weight during this process is equal to :
(A) The work done by the boy against the gravitational force acting on the weight.
(B) The loss of the stored energy by the spring minus the work done by the tension in the spring.
(C) The work done on the weight by the boy plus the stored energy lost by the spring.
(D) The work done on the weight by the boy minus the workdone by the tension in the spring plus the stored energy lost by the spring.

17. A rope ladder with a length $\ell$ carrying a man of mass m at its end is attached to the basket of balloon with a mass M. The entire system is in equilibrium in the air. As the man climbs up the ladder into the balloon, the balloon descends by a height h. Then the potential energy of the man :
(A) Increases by $mg(\ell - h)$ (B) Increases by $mg\ell$
(C) Increases by mgh (D) Increases by $mg(2\ell - h)$

18. A block attached to a spring, pulled by a constant horizontal force, is kept on a smooth surface as shown in the figure. Initially, the spring is in the natural state. Then the maximum positive work that the applied force F can do is : [Given that spring does not break]




(A) $\frac{F^2}{k}$ (B) $\frac{2F^2}{k}$ (C) $\infty$ (D) $\frac{F^2}{2k}$

19. A simple pendulum has a string of length $\ell$ and bob of mass m. When the bob is at its lowest position, it is given the minimum horizontal speed necessary for it to move in a circular path about the point of suspension. The tension in the string at the lowest position of the bob is :
(A) 3mg (B) 4mg (C) 5mg (D) 6mg

20. In the previous question, when the string is horizontal, the net force on the bob is :
(A) mg (B) 3mg (C) $\sqrt{10}mg$ (D) 4mg

21. A particle of mass m is fixed to one end of a light rigid rod of length $\ell$ and rotated in a vertical circular path about its other end. The minimum speed of the particle at its highest point must be :
(A) zero (B) $\sqrt{g\ell}$ (C) $\sqrt{1.5g\ell}$ (D) $\sqrt{2g\ell}$

22. A stone tied to a string of length L is whirled in a vertical circle, with the other end of the string at the centre. At a certain instant of time, the stone is at its lowest position and has a speed u. The magnitude of the change in its velocity as it reaches a position where the string is horizontal is :
(A) $\sqrt{u^2 - 2gL}$ (B) $\sqrt{2gL}$ (C) $\sqrt{u^2 - gL}$ (D) $\sqrt{2(u^2 - gL)}$

23. A marble of mass m and radius b is placed in a hemispherical bowl of radius r. The minimum velocity to be given to the marble so that it reaches the highest point is :
(A) $\sqrt{2g(r-b)}$ (B) $\sqrt{2gr}$ (C) $\sqrt{2g(r+b)}$ (D) $\sqrt{g(r-b)}$

24. A particle is placed at the top of a sphere of radius r. It is given a little jerk so that it just starts slipping down. Find the point where it leaves the sphere.
(A) r/2 (B) r/3 (C) r/4 (D) r

25. A particle is moving in a circular path with a constant speed v. If $\theta$ is the angular displacement, then starting from $\theta = 0^0$, the maximum and minimum change in the linear momentum will occur when value of $\theta$ is respectively :
(A) 45º & 90º (B) 90º & 180º (C) 180º & 360º (D) 90º & 270º

26. In a simple pendulum, the breaking strength of the string is double the weight of the bob. The bob is released from rest when the string is horizontal. The string breaks when it makes an angle $\theta$ with the vertical–
(A) $\theta = \cos^{-1}\left(\frac{1}{3}\right)$ (B) $\theta = 60$ (C) $\theta = \cos^{-1}\left(\frac{2}{3}\right)$ (D) $\theta = 0$

## ANSWER KEY

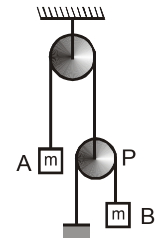
LEVEL–1

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | D | C | B | D | B | A | A | A | B | C | C | B | D | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | | |
| C | A | B | D | C | A | D | A | B | C | C | | | | |

# WORK , ENERGY & POWER & CIRCULAR MOTION -LEVEL 2

SELECT THE CORRECT ALTERNATIVES (ONE OR MORE THEN ONE CORRECT ANSWERS)

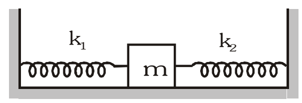
1. In the figure shown, the system is released from rest. Find the velocity of block A when block B has fallen a distance '$\ell$'. Assume all pulleys to be massless and frictionless.




(A) $\sqrt{\frac{g\ell}{5}}$ (B) $\sqrt{g\ell}$

(C) $\sqrt{5g\ell}$ (D) None of these

2. A block of mass m is attached to two spring of spring constant $k_1$ and $k_2$ as shown in figure. The block is displaced by x towards right and released. The velocity of the block when it is at x/2 will be :

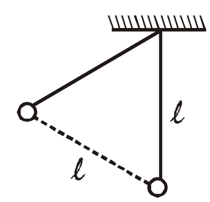



(A) $\sqrt{\frac{(k_1+k_2)x^2}{2m}}$ (B) $\sqrt{\frac{3}{4}\frac{(k_1+k_2)x^2}{m}}$ (C) $\sqrt{\frac{(k_1+k_2)x^2}{m}}$ (D) $\sqrt{\frac{(k_1+k_2)x^2}{4m}}$

3. An object of mass m slides down a hill of height h of arbitrary shape and after travelling a certain horizontal path stops because of friction. The friction coefficient is different for different segments for the entire path but is independent of the velocity and direction of motion. The work that a force must perform to return the object to its initial position along the same path is :

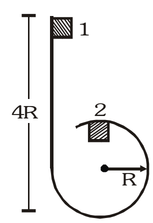
(A) mgh (B) 2mgh (C) 4mgh (D) –mgh

4. A bob hangs from a rigid support by an inextensible string of length $\ell$. If it is displaced through a distance $\ell$ (from the lowest position) keeping the string straight & released, the speed of the bob at the lowest position is:




(A) $\sqrt{g\ell}$ (B) $\sqrt{3g\ell}$ (C) $\sqrt{2g\ell}$ (D) $\sqrt{5g\ell}$

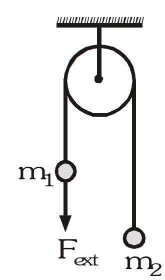
5. A cube of mass M starts at rest from point 1 at a height 4R, where R is the radius of the circular track. The cube slides down the frictionless track and around the loop. The force which the track exerts on the cube at point 2 is :




(A) 3 mg (B) mg

(C) 2 mg (D) cube will not reach the point 2.

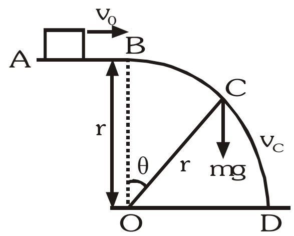
6. Two bodies of mass $m_1$ and $m_2$ ($m_2 > m_1$) are connected by a light inextensible string which passes through a smooth fixed pulley. The instantaneous power delivered by an external agent to pull $m_1$ with constant velocity v is :




(A) $(m_2 - m_1)$ g/v (B) $(m_2 - m_1)$ v/g

(C) $(m_2 - m_1)$ gv (D) $(m_1 - m_2)$ gv

7. A small block slides with velocity $0.5\sqrt{gr}$ on the horizontal frictionless surface as shown in the figure. The block leaves the surface at point C. The angle $\theta$ in the figure is :




(A) $\cos^{-1}\frac{4}{9}$ (B) $\cos^{-1}\frac{3}{4}$ (C) $\cos^{-1}\frac{1}{2}$ (D) $\cos^{-1}\frac{4}{5}$

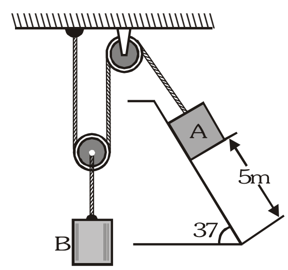
8. A man places a chain of mass 'm' and length '$\ell$' on a table slowly. Initially the lower end of the chain just touches the table. The man drops the chain when half of the chain is in vertical position. Then work done by the man in this process is :

(A) $-mg\frac{\ell}{2}$ (B) $-\frac{mg\ell}{4}$ (C) $-\frac{3mg\ell}{8}$ (D) $-\frac{mg\ell}{8}$

9. The potential energy of a particle of mass m free to move along x–axis is given by U =½ $kx^2$ for $x < 0$ and $U = 0$ for $x \geq 0$ (x denotes the x–coordinate of the particle and k is a positive constant). If the total mechanical energy of the particle is E, then its speed at $x = -\sqrt{\frac{2E}{k}}$ is :

(A) zero (B) $\sqrt{\frac{2E}{m}}$ (C) $\sqrt{\frac{E}{m}}$ (D) $\sqrt{\frac{E}{2m}}$

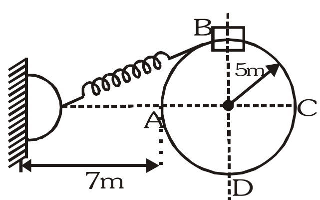
10. The blocks A and B shown in the figure have masses $M_A$ = 5 kg and $M_B$ = 4 kg. The system is released from rest. The speed of B after A has travelled a distance 1 m along the incline is :




(A) $\frac{\sqrt{3}}{2}\sqrt{g}$ (B) $\frac{\sqrt{3}}{4}\sqrt{g}$

(C) $\frac{\sqrt{g}}{2\sqrt{3}}$ (D) $\frac{\sqrt{g}}{2}$

11. A collar 'B' of mass 2 kg is constrained to move along a horizontal smooth and fixed circular track of radius 5m. The spring lying in the plane of the circular track and having spring constant 200 N/m is undeformed when the collar is at 'A'. If the collar starts from rest at B' the normal reaction exerted by the track on the collar when it passes through 'A' is :

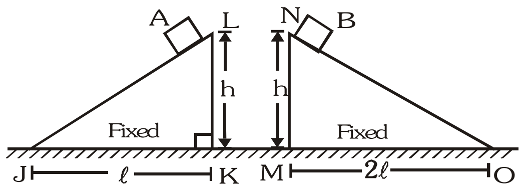



(A) 360 N (B) 720 N (C) 1440 N (D) 2880 N

12. A particle is projected along a horizontal field whose coefficient of friction varies as $\mu = \frac{A}{r^2}$ where r is the distance from the origin in meters and A is a positive constant. The initial distance of the particle is 1 m from the origin and its velocity is radially outwards. The minimum initial velocity at this point so that particle never stops is :

(A) $\infty$ (B) $2\sqrt{gA}$ (C) $\sqrt{2gA}$ (D) $4\sqrt{gA}$

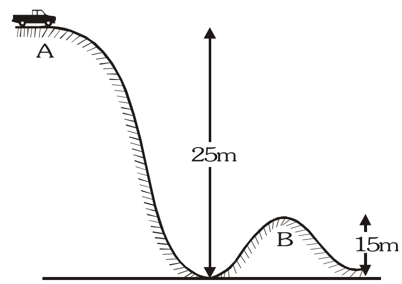
**13.** Two identical blocks A and B are placed on two inclined planes as shown in diagram. Neglect air resistance and other friction. Choose the correct statement :




**Statement I:** Kinetic energy of 'A' on sliding to J will be greater than the kinetic energy of B on falling to M.
**Statement II:** Acceleration of 'A' will be greater than acceleration of 'B' when both are released to slide on inclined plane.
**Statement III** : Work done by external agent to move block slowly from position B to O is negative

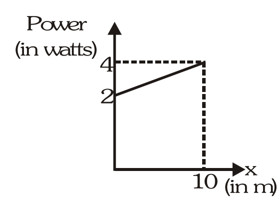
(A) statement I is true (B) statement II is true
(C) statement I and III are true (D) statement II and III are true

**14.** Figure shows the roller coaster track. Each car will start from rest at point A and will roll with negligible friction. It is important that there should be at least some small positive normal force exerted by the track on the car at all points, otherwise the car would leave the track. With the above fact, the minimum safe value for the radius of curvature at point B is ($g = 10\ m/s^2$) :




(A) 20 m (B) 10 m
(C) 40 m (D) 25 m

**15.** A particle 'A' of mass $\frac{10}{7}$ kg is moving in the positive x–direction. Its initial position is x = 0 & initial velocity is 1 m/s. The velocity at x = 10m is : (use the graph given)




(A) 4 m/s (B) 2 m/s (C) $3\sqrt{2}\,m/s$ (D) 100/3 m/s

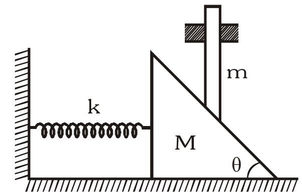
**16.** A fire hose has a diameter of 2.5 cm and is required to direct a jet of water to a height of at least 40m. The minimum power of the pump needed for this hose is :
(A) 21.5 kW (B) 40 kW (C) 36.5 kW (D) 48 kW

**17.** A particle is projected vertically upwards with a speed of 16 m/s, after some time, when it again passes through the point of projection, its speed is found to be 8 m/s. It is known that the work done by air resistance is same during upward and downward motion. Then the maximum height attained by the particle is : (Take $g = 10\ m/s^2$)
(A) 8 m (B) 4.8 m (C) 17.6 m (D) 12.8 m

**18.** A force $\vec{F} = \left(3\tilde{i} + 4\tilde{j}\right)$ N acts on a 2 kg movable object that moves from an initial position $\vec{d_i} = \left(-3\tilde{i} - 2\tilde{j}\right)$ m to final position $\vec{d_f} = \left(5\tilde{i} + 4\tilde{j}\right)$ in 6s. The average power delivered by the force during the interval is equal to :

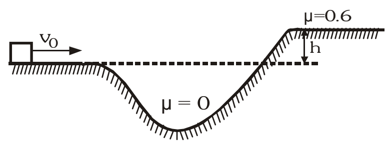
(A) 8 watt (B) $\frac{50}{6}$ watt (C) 15 watt (D) $\frac{50}{3}$ watt

19. A wedge of mass M fitted with a spring of stiffness 'k' is kept on a smooth horizontal surface. A rod of mass m is kept on the wedge as shown in the figure. System is in equilibrium. Assuming that all surfaces are smooth, the potential energy stored in the spring is:



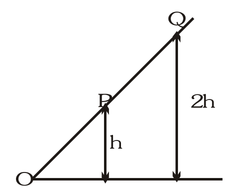

(A) $\frac{mg^2 \tan^2 \theta}{2k}$ (B) $\frac{m^2 g \tan^2 \theta}{2k}$ (C) $\frac{m^2 g^2 \tan^2 \theta}{2k}$ (D) $\frac{m^2 g^2 \tan^2 \theta}{k}$

20. In the figure, a block slides along a track from one level to a higher level, by moving through an intermediate valley. The track is frictionless untill the block reaches the higher level. There a frictional force stops the block in a distance d. The block's initial speed $v_0$ is 6 m/s, the height difference h is 1.1 m and the coefficient of kinetic friction μ is 0.6. The value of d is




(A) 1.17 m (B) 1.71 m (C) 7.11 m (D) 11.7 m

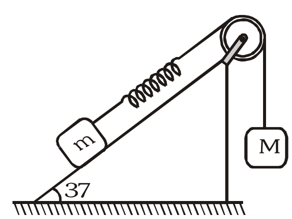
21. A ball rolls down an inclined plane figure. The ball is first released from rest from P and then later from Q. Which of the following statement is/are correct ?




(A) The ball takes twice as much time to roll from Q to O as it does to roll from P to O.
(B) The acceleration of the ball at Q is twice as large as the acceleration at P.
(C) The ball has twice as much K.E. at O when rolling from Q as it does when rolling from P
(D) None of the above

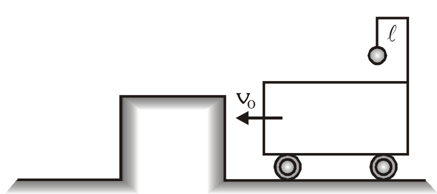
22. A car of mass m starts moving so that its velocity varies according to the law $v = a\sqrt{s}$ , where a is a constant, and s is the distance covered. The total work performed by all the forces which are acting on the car during the first t seconds after the beginning of motion is :
(A) $ma^4t^2/8$ (B) $ma^2t^4/8$ (C) $ma^4t^2/4$ (D) $ma^2t^4/4$

23. A block of mass m is attached with a massless spring of force constant k. The block is placed over a rough inclined surface for which the coefficient of friction is μ = 3/4. The minimum value of M required to move the block up the plane is : (Neglect mass of string and pulley and friction in pulley)




(A) $\frac{3}{5}$ m (B) $\frac{4}{5}$ m (C) 2 m (D) $\frac{3}{2}$ m

24. A bob is suspended from a crane by a cable of length $\ell$ = 5 m. The crane and load are moving at a constant speed $v_0$. The crane is stopped by a bumper and the bob on the cable swings out an angle of 60 . The initial speed $v_0$ is– (g = 9.8 m/s²)

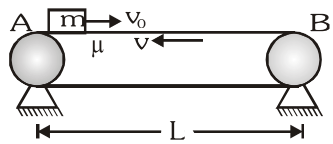



(A) 10 m/s (B) 7 m/s (C) 4 m/s (D) 2 m/s

25. If one of the forces acting on a particle is conservative then :
(A) Its work is zero when the particle moves exactly once around any closed path.
(B) Its work equals the change in the kinetic energy of the particle.
(C) It obeys Newton's second law.
(D) Its work depends on the end points of the motion, not on the path between.

26. A particle of mass m = 1 kg lying on x–axis experiences a force given by law F=x(3x–2) Newton, where x is the x–coordinate of the particle in meters. The points on x–axis where the particle is in equilibrium are :
(A) x = 0 (B) x = 1/3 (C) x = 2/3 (D) x = 1

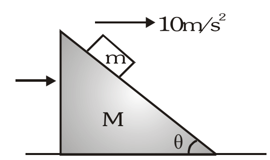
27. With what minimum velocity $v_0$ should block be projected from left end A towards end B such that it reaches the other end B of conveyer belt moving with constant velocity v ? Friction coefficient between block and belt is $\mu$.




(A) $\sqrt{\mu g L}$ (B) $\sqrt{2\mu g L}$ (C) $\sqrt{3\mu g L}$ (D) $2\sqrt{\mu g L}$

28. A light spring of length 20 cm and force constant 2 N/cm is placed vertically on a table. A small block of mass 1 kg falls on it. The length h from the surface of the table at which the block will have the maximum velocity is :
(A) 20 cm (B) 15 cm (C) 10 cm (D) 5cm

29. In the figure shown all the surfaces are frictionless, and mass of the block, m = 1 kg. The block and wedge are held initially at rest. Now wedge is given a horizontal acceleration of 10 m/s$^2$ by applying a force on the wedge, so that the block does not slip on the wedge. Then work done by the normal force in ground frame on the block in $\sqrt{3}$ seconds is :

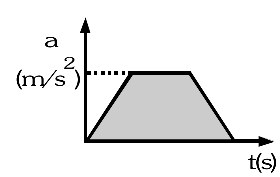


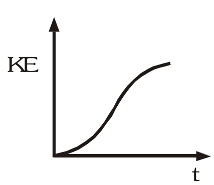

(A) 30J (B) 60 J (C) 150 J (D) 100 $\sqrt{3}$ J

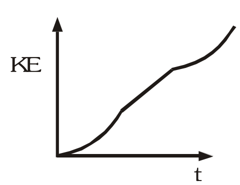
30. When a conservative force does positive work on a body :
(A) The potential energy increases (B) The potential energy decreases
(C) Total energy increases (D) Total energy decreases

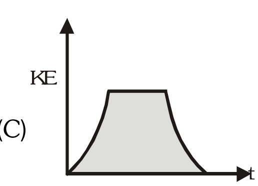
31. A 1.0 kg block collides with a horizontal weightless spring of force constant 2.75 Nm$^{-1}$. The block compresses the spring 4.0 m from the rest position. If the coefficient of kinetic friction between the block and horizontal surface is 0.25, the speed of the block at the instant of collision is :
(A) 0.4 ms$^{-1}$ (B) 4 ms$^{-1}$ (C) 0.8 ms$^{-1}$ (D) 8 ms$^{-1}$

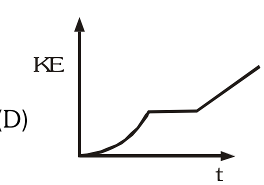
32. Acceleration versus time graph of a particle moving in a straight line is as shown in adjoining figure. If initially particle was at rest then corresponding kinetic energy versus time graph will be:



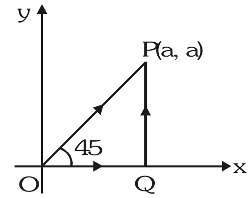

(A)


(B)


(C)


(D)


**33.** A particle is moved from (0, 0) to (a, a) under a force $\vec{F} = (3\hat{i} + 4\hat{j})$ from two paths. Path 1 is OP and path 2 is OQP. Let $W_1$ and $W_2$ be the work done by this force in these two paths. Then :

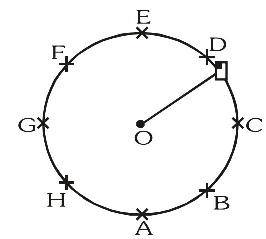



(A) $W_1 = W_2$ (B) $W_1 = 2W_2$
(C) $W_2 = 2W_1$ (D) $W_2 = 4W_1$

**34.** A particle of mass m begins to slide down a fixed smooth sphere from the top. What is the tangential acceleration when it breaks off the sphere?

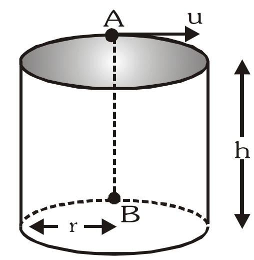
(A) $\frac{2g}{3}$ (B) $\frac{\sqrt{5}g}{3}$ (C) g (D) $\frac{g}{3}$

**35.** A machine, in an amusement park, consists of a cage of the end of one arm, hinged at O. The cage revolves along a vertical circle of radius r (ABCDEFGH) about its hinge O, at constant linear speed v= $\sqrt{gr}$ . The cage is so attached that the man of weight 'W' standing on a weighing machine, inside the cage, is always vertical. Then which of the following is correct




(A) The weight reading at A is greater than the weight reading at E by 2W
(B) The weight reading at G = W
(C) The ratio of the weight reading at E to that at A = 0
(D) The ratio of the weight reading at A to that at C = 2

**36.** A hollow vertical cylinder of radius r and height h has a smooth internal surface. A small particle is placed in contact with the inner side of the upper rim, at point A, and given a horizontal speed u, tangential to the rim. It leaves the lower rim at point B, vertically below A. If n is an integer then–




(A) $\frac{u}{2\pi r}\sqrt{\frac{2h}{g}} = n$ (B) $\frac{h}{2\pi r} = n$

(C) $\frac{2\pi r}{h} = n$ (D) $\frac{u}{\sqrt{2gh}} = n$

**37.** The kinetic energy K of a particle moving along a circle of radius R depends upon the distance s, as K = as . The force acting on the particle is–

(A) $2a\frac{s}{R}$ (B) $2as\left(1+\frac{s}{R^2}\right)^{\frac{1}{2}}$ (C) 2as (D) 2a

**38.** A simple pendulum of length L and mass (bob) M is oscillating in a plane about a vertical line between angular limits $-\phi$ and $\phi$. For an angular displacement $\theta$, $[|\theta|<\phi]$ the tension in the string and velocity of the bob are T and v respectively. The following relations hold good under the above conditions

(A) $T\cos\theta = Mg$ (B) $T - Mg\cos\theta = \frac{Mv^2}{L}$

(C) Tangential acceleration $= g\sin\theta$ (D) $T = Mg\cos\theta$

## LEVEL 2 ANSWER KEY

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | A | B | B | A | A | C | B | C | A | C | C | C | D | A | A |
| Que. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | A | A | A | C | A | C | A | A | B | A,C,D | A,C | B | B | C | B |
| Que. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | | | | | | | |
| Ans. | D | A | A | B | A,B,C,D | A | B | B,C | | | | | | | |