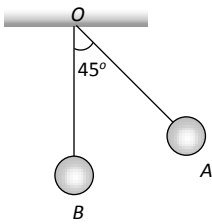


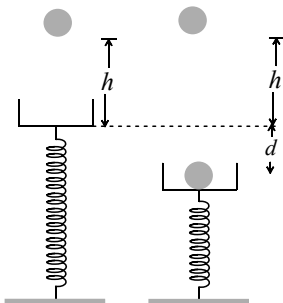
Topic :- WORK ENERGY AND POWER

- If momentum is increased by 20%, then kinetic energy increases by
a) 48% b) 44% c) 40% d) 36%
- Two spherical bodies of the same mass M are moving with velocities v_1 and v_2 . These collide perfectly inelastically, then the loss in kinetic energy is
a) $\frac{1}{2}M(v_1 - v_2)$ b) $\frac{1}{2}M(v_1^2 - v_2^2)$ c) $\frac{1}{4}M(v_1 - v_2)^2$ d) $2M(v_1^2 - v_2^2)$
- A person holds a bucket of weight 60 N. He walks 7m along the horizontal path and then climbs up a vertical distance of 5 m. The work done by the man is
a) 300 J b) 420 J c) 720 J d) None of these
- A coolie 1.5 m tall raises a load of 80 kg in 2 s from the ground to his head and then walks a distance of 40 m in another 2 s. The power developed by the coolie is [$g = 10 \text{ ms}^{-2}$]
a) 0.2 kW b) 0.4 kW c) 0.6 kW d) 0.8 kW
- A boy of mass 1 kg moves from point $A(2m, 3m, 4m)$ to $B(3m, 2m, 5m)$. During motion of body, a force $\vec{F} = (2N)\hat{i} - (4N)\hat{j}$ acts on it. The work done by the force on the particle displacement is
a) $(2\hat{i} - 4\hat{j})J$ b) 2 J c) - 2 J d) None of these
- A body of mass m accelerates uniformly from rest to v_1 in time t_1 . The instantaneous power delivered to the body as a function of time t is
a) $\frac{mv_1t}{t_1}$ b) $\frac{mv_1^2t}{t_1^2}$ c) $\frac{mv_1t^2}{t_1}$ d) $\frac{mv_1^2t}{t_1}$

7. The bob A simple pendulum is released when the string makes an angle of 45° with the vertical. It hits another bob B of the same material and same mass kept at rest on the table. If the collision is elastic

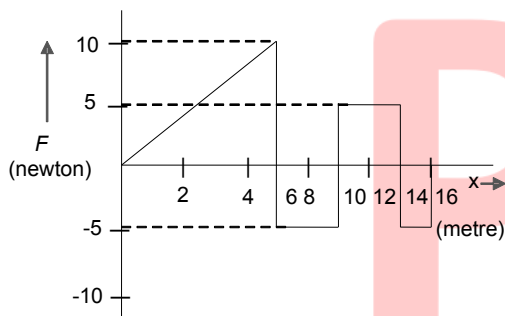


- a) Both A and B rise to the same height
 b) Both A and B come to rest at B
 c) Both A and B move with the same velocity of A
 d) A comes to rest and B moves with the velocity of A
8. An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of 2 m/s . The mass per unit length of water in the pipe is 100 kg/m . What is the power of the engine
- a) 800 W b) 400 W c) 200 W d) 100 W
9. A ball of weight 0.1 kg coming with speed 30 m/s strikes with a bat and returns in opposite direction with speed 40 m/s , then the impulse is (Taking final velocity as positive)
- a) $-0.1 \times (40) - 0.1 \times (30)$ b) $0.1 \times (40) - 0.1 \times (-30)$
 c) $0.1 \times (40) + 0.1 \times (-30)$ d) $0.1 \times (40) - 0.1 \times (20)$
10. If the kinetic energy of a body is increased 2 times, its momentum will
- a) Half b) Remain unchanged c) Be doubled d) increase $\sqrt{2}$ times
11. A vertical spring with force constant K is fixed on a table. A ball of mass m at a height h above the free upper end of the spring falls vertically on the spring so that the spring is compressed by a distance d . The net work done in the process is



- a) $mg + (h + d) + \frac{1}{2}Kd^2$ b) $mg(h + d) - \frac{1}{2}Kd^2$
 c) $mg(h - d) - \frac{1}{2}Kd^2$ d) $mg(h - d) + \frac{1}{2}Kd^2$

12. A wire of length L suspended vertically from a rigid support is made to suffer extension l in its length by applying a force F . The work is
 a) $\frac{Fl}{2}$ b) Fl c) $2Fl$ d) Fl
13. An ideal spring with spring constant k is hung from the ceiling and a block of mass M is attached to its lower end. The mass is released with the spring initially unstretched. Then the maximum extension in the spring is
 a) $\frac{4Mg}{k}$ b) $\frac{2Mg}{k}$ c) $\frac{Mg}{k}$ d) $\frac{Mg}{2k}$
14. A car manufacturer claims that his car can be accelerated from rest to a velocity of 10 ms^{-1} in 5 s. If the total mass of the car and its occupants is 1000 kg, then the average horse power developed by the engine is
 a) $\frac{10^3}{746}$ b) $\frac{10^4}{746}$ c) $\frac{10^5}{746}$ d) 8
15. A particle is acted upon by a force F which varies with position x as shown in figure. If the particle at $x = 0$ has kinetic energy of 25 J, then the kinetic energy of the particle at $x = 16 \text{ m}$ is



- a) 45 J b) 30 J c) 70 J d) 135J
16. A ball moving with velocity 2 m/s . collides head on with another stationary ball of double the mass. If the coefficient of restitution is 0.5, then their velocities (in m/s) after collision will be
 a) 0, 2 b) 0, 1 c) 1, 1 d) 1, 0.5
17. If the water falls from a dam into a turbine wheel 19.6 m below, then the velocity of water at the turbine is ($g = 9.8 \text{ m/s}^2$)
 a) 9.8 m/s b) 19.6 m/s c) 39.2 m/s d) 98.0 m/s
18. The potential energy function for the force between two atoms in a diatomic molecule is approximately given by $U(x) = \frac{a}{x^{12}} - \frac{b}{x^6}$, where a and b are constants and x is the distance between the atoms, If the dissociation energy of the molecule is $D = [U(x = \infty) - U_{\text{atequilibrium}}]$, D is
 a) $\frac{b^2}{2a}$ b) $\frac{b^2}{12a}$ c) $\frac{b^2}{4a}$ d) $\frac{b^2}{6a}$

19. A body at rest breaks into two pieces with unequal mass
- a) Both of them have equal speeds
 - b) Both of them move along a same line with unequal speeds
 - c) Sum of their momentum is non zero
 - d) They move along different lines with different speeds
20. A body of mass 2 kg moving with a velocity of 3 ms^{-1} collides head on with a body of mass 1 kg moving in opposite direction with a velocity of 4 ms^{-1} . After collision two bodies stick together and move with a common velocity which in ms^{-1} is equal to
- a) $\frac{1}{4}$
 - b) $\frac{1}{3}$
 - c) $\frac{2}{3}$
 - d) $\frac{3}{4}$

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