DPP

DAILY PRACTICE PROBLEMS

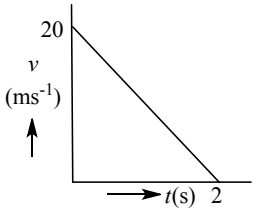
CLASS : XITH **SUBJECT : PHYSICS**

DATE : **DPP NO. :8**

Topic :- WORK ENERGY AND POWER

1. Identify the false statement from the following
   a) Work-energy theorem is not independent of Newton's second law
   b) Work-energy theorem holds in all inertial frames
   c) Work done by friction over a closed path is zero
   d) No potential energy can be associated with friction

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



   a) 400 J b) - 400 J c) - 200 J d) 200 J

3. If the unit of force and length each be increased by four times, then the unit of energy is increased by
   a) 16 times b) 8 times c) 2 times d) 4 times

4. A rod AB of mass $10kg$ and length $4m$ rests on a horizontal floor with end A fixed so as to rotate it in vertical plane about perpendicular axis passing through A. If the work done on the rod is $100\ J$, the height to which the end B be raised vertically above the floor is
   a) 1.5 m b) 2.0 m c) 1.0 m d) 2.5 m

5. A particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the particle, the motion of the particle takes place in a plane. It follows that
   a) Its velocity is constant b) Its acceleration is constant
   c) Its kinetic energy is constant d) It moves in a straight line

6. From an automatic gun a man fires 360 bullet per minute with a speed of 360 $km/hour$. If each weighs 20 g, the power of the gun is

a) 600 W b) 300 W c) 150 W d) 75 W

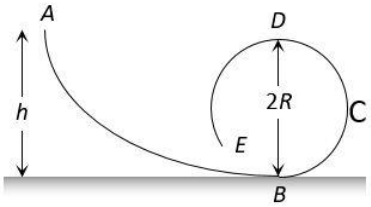
7. A motor of power p_0 is used to deliver water at a certain rate through a given horizontal pipe. To increase the rate of flow of water through the same pipe n times, the power of the motor is increased to p_1. The ratio of p_1 to p_0 is

a) $n:1$ b) $n^2:1$ c) $n^3:1$ d) $n^4:1$

8. A ^{238}U nucleus decays by emitting an alpha particle of speed $v\ ms^{-1}$. The recoil speed of the residual nucleus is (in ms^{-1})

a) $-4v/234$ b) $v/4$ c) $-4v/238$ d) $4v/238$

9. A frictionless track $ABCDE$ ends in a circular loop of radius R. A body slides down the track from point A which is it a height $\mathrm{h} = 5\ cm$. Maximum value of R for the body to successfully complete the loop is



a) 5 cm b) $\frac{15}{4}\ cm$ c) $\frac{10}{3}\ cm$ d) 2 cm

10. A ball of mass $2kg$ and another of mass $4kg$ are dropped together from a 60 $feet$ tall building. After a tall of 30 $feet$ each towards earth, their respective kinetic energies will be in the ratio of

a) $\sqrt{2}:1$ b) $1:4$ c) $1:2$ d) $1:\sqrt{2}$

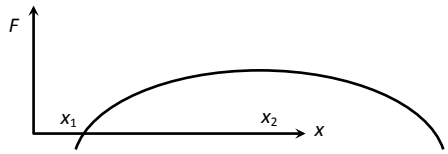
11. A body is initially at rest. It undergoes one-dimensional motion with constant acceleration. The power delivered to it at time t is proportional to

a) $t^{1/2}$ b) t c) $t^{3/2}$ d) t^2

12. A billiards player hits a stationary ball by an identical ball to pocket the target ball in a corner pocket that is at an angle of 35° with respect to the direction of motion of the first ball. Assuming the collision as elastic and that friction and rotational motion are not important, the angle made by the target ball with respect to the incoming ball is

a) 35° b) 50° c) 55° d) 60°

13. The force acting on a body moving along x-axis varies with the position of the particle as shown in the fig



The body is in stable equilibrium at

a) $x = x_1$ b) $x = x_2$ c) Both x_1 and x_2 d) Neither x_1 nor x_2

14. A bullet of mas m moving with velocity v strikes a block of mass M at rest and gets embedded into it. The kinetic energy of the composite block will be

a) $\frac{1}{2}mv^2 \times \frac{m}{(m+M)}$ b) $\frac{1}{2}mv^2 \times \frac{M}{(m+M)}$ c) $\frac{1}{2}mv^2 \times \frac{(M+m)}{(M)}$ d) $\frac{1}{2}Mv^2 \times \frac{m}{(m+M)}$

15. The machine gun fires 240 bullets per minute. If the mass of each bullet is 10 g and the velocity of the bullets is 600 ms^{-1},the power (in KW)of the gun is

a) 43200 b) 432 c) 72 d) 7.2

16. The kinetic energy acquired by a body of mass m in travelling some distance s, starting from rest under the action of a constant force, is directly proportional to

a) m° b) m c) m^2 d) $\sqrt{m}$

17. Two bodies of masses m_1 and m_2 have equal kinetic energies. If p_1 and p_2 are their respective momentum, then ratio p_1: p_2 is equal to

a) m_1:m_2 b) m_2:m_1 c) $\sqrt{m_1}$:$\sqrt{m_2}$ d) m_1^2:m_2^2

18. The blocks of mass m each are connected to a spring of spring constant k as shown in figure. The maximum displacement in the block is

a) $\sqrt{\frac{2mv^2}{k}}$ b) $\sqrt{\frac{mv^2}{k}}$ c) $2\sqrt{\frac{mv^2}{k}}$ d) $2\sqrt{\frac{k}{mv^2}}$

19. Two solid rubber balls A and B having masses 200 and 400 g respectively are moving in opposite directions with velocity of A equal to 0.3 m/s. After collision the two balls come to rest, then the velocity of B is

a) 0.15 m/sec b) 1.5 m/sec c) - 0.15 m/sec d) None of the above

20. A ball hits a vertical wall horizontally at 10 m/s bounces back at 10 m/s

a) There is no acceleration because $10\frac{m}{s}$ - $10\frac{m}{s} = 0$

b) There may be an acceleration because its initial direction is horizontal

c) There is an acceleration because there is a momentum change

d) Even though there is no change in momentum there is a change in direction. Hence it has an acceleration