DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**

DATE : **DPP NO. :7**

Topic :- WORK ENERGY AND POWER

1. When a man increases his speed by 2 ms^{-1}, he finds that his kinetic energy is doubled, the original speed of the man is

   a) $2(\sqrt{2} - 1)$ ms^{-1} b) $2(\sqrt{2} + 1)$ ms^{-1} c) 4.5 ms^{-1} d) None of these

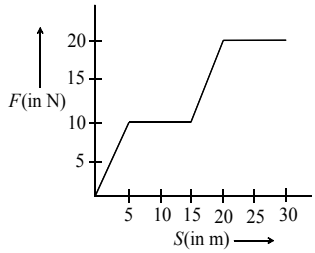
2. A stone is dropped from the top of a tall tower. The ratio of the kinetic energy of the stone at the end of three seconds to the increase in the kinetic energy of the stone during the next three seconds is

   a) 1 : 1 b) 1 : 2 c) 1 : 3 d) 1 : 9

3. A mass of 10 g moving with a velocity of 100 cm/s strikes a pendulum bob of mass 10 g. The two masses stick together. The maximum height reached by the system now is ($g = 10\ m/s^2$)

   a) Zero b) 5 cm c) 2.5 cm d) 1.25 cm

4. The work done by a force acting on a body is as shown in the graph. The total work done in covering an initial distance of 20 m is



   a) 225 J b) 200 J c) 400 J d) 175 J

5. A force of 5 N moves the particle through a distance of 10 m. If 25 J of work is performed, then the angle between the force and the direction of motion is

   a) 0° b) 90° c) 30° d) 60°

6. An electric pump is used to fill an overhead tank of capacity $9m^3$ kept at a height of 10 m above the ground .If the pump takes 5 min to fill the tank by consuming 10 KW .power the efficiency of the pump should be (Take g=10 ms^{-2})

   a) 60 % b) 40 % c) 20 % d) 30 %

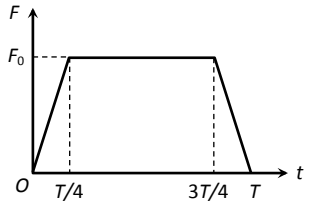
7. A particle is projected at 60° to the horizontal with a kinetic energy K. The kinetic energy at the highest point is

a) K b) Zero c) $\frac{K}{4}$ d) $\frac{K}{2}$

8. Two identical mass m moving with velocities $u_1$and $u_2$collide perfectly inelastically. Find the loss in energy

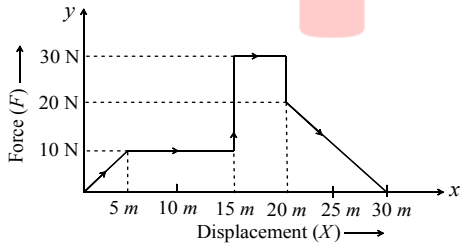
a) $m(u_1 - u_2^2)$ b) $\frac{m}{4}(u_1 - u_2)^2$ c) $\frac{m}{2}(u_1 - u_2)^2$ d) $m(u_1 - u_2)^3$

9. A particle of mass m moving with a velocity u makes an elastic one dimensional collision with a stationary particle of mass m establishing a contact with it for extremely small time T. Their force of contact increases from zero to F_0 linearly in time $T/4$, remains constant for a further time $T/2$ and decreases linearly from F_0 to zero in further time $T/4$ as shown. The magnitude possessed by F_0 is



a) $\frac{mu}{T}$ b) $\frac{2mu}{T}$ c) $\frac{4mu}{3T}$ d) $\frac{3mu}{4T}$

10. Given below is a graph between a variable force (F) (along y-axis) and the displacement (X) (along x-axis) of a particle in one dimension. The work done by the force in the displacement interval between 0 m and 30 m is



a) 275 J b) 375 J c) 400 J d) 300 J

11. If velocity of a body is twice of previous velocity, then kinetic energy will become

a) 2 times b) $\frac{1}{2}$ times c) 4 times d) 1 times

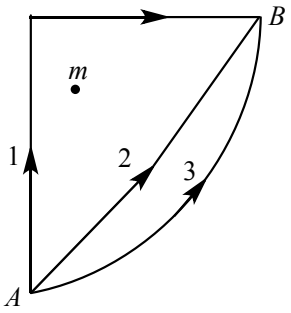
12. The power of a pump, which can pump 200 kg of water to a height of 200 m in 10sec is ($g = 10$ m/s^2)

a) 40 kW b) 80 kW c) 400 kW d) 960 kW

13. If a man speeds up by 1ms^{-1}, his KE increase by 44%. His original speed in ms^{-1} is

a) 1 b) 2 c) 5 d) 4

14. If w_1,$w_{2\ and\ W_3}$ represent the work done in moving a particle from A to B along three different paths 1, 2 and 3 respectively(as shown)in the gravitational field of a point mass m. Find the correct relation between w_1,$w_2 and\ w_3$



a) $w_1 > w_2 > w_3$ b) $w_1 = w_2 = w_3$ c) $w_1 < w_2 < w_3$ d) $w_2 > w_1 > w_3$

15. A machine which is 75% efficient uses 12 J of energy in lifting up a 1 kg mass through a certain distance. The mass is then allowed to fall through, that distance. The velocity of the ball at the end of its fall is

a) $\sqrt{24}$ ms^{-1} b) $\sqrt{32}$ ms^{-1} c) $\sqrt{18}$ ms^{-1} d) 3 ms^{-1}

16. 1 kg body explodes into three fragments. The ratio of their masses is 1:1:3. The fragments of same mass move perpendicular to each other with speeds 30ms^{-1}, while the heavier part remains in the initial direction. The speed of heavier part is

a) $\frac{10}{\sqrt{2}}$ms^{-1} b) $10\sqrt{2}$ ms^{-1} c) $20\sqrt{2}$ ms^{-1} d) $30\sqrt{2}$ ms^{-1}

17. Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The losses due to frictional forces are 10% of energy. How much power is generated by the turbine ($g = 10\ m/s^2$)

a) 12.3 kW b) 7.0 kW c) 8.1 kW d) 10.2 kW

18. In an inelastic collision

a) Only momentum is conserved
b) Only kinetic energy is conserved
c) Neither momentum nor kinetic energy is conserved
d) Both momentum and kinetic energy are conserved

19. A ball is released from the top of a tower. The ratio of work done by force of gravity in first, Second and third second of the motion of the ball is

a) 1:2:3 b) 1:4:9 c) 1:3:5 d) 1:5:3

20. If a particle is compelled to move on a given smooth plane curve under the action of given forces in the plane $\vec{\mathbf{F}} = x\hat{\mathbf{i}} + y\hat{\mathbf{j}}$, then

a) $\vec{\mathbf{F}}.\overrightarrow{\mathbf{dr}} = xdx + ydy$ b) $\int \vec{\mathbf{F}}.\overrightarrow{\mathbf{dr}} \neq \frac{1}{2}mv^2$

c) $\vec{\mathbf{F}}.\overrightarrow{\mathbf{dr}} \neq xdx + ydy$ d) $\frac{1}{2}mv^2 \neq \int(xdx + ydy)$