DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. :5**

Topic :- WORK ENERGY AND POWER

1. A body is moved along a straight line by machine delivering a constant power. The distance moved by the body in time t is proportional to
   a) $t^{3/4}$ b) $t^{3/2}$ c) $t^{1/4}$ d) $t^{1/2}$

2. A 2.0 kg block is dropped from a height of 40 cm onto a spring of spring constant $k =$ 1960 Nm^{-1}. Find the maximum distance the spring is compressed
   a) 0.080 m b) 0.20 m c) 0.40 m d) 0.10 m

3. A body of mass m is rest. Another body of same mass moving with velocity v makes head on elastic collision with the first body. After collision the first body starts to moves with velocity
   a) v b) Remain at rest c) 2v d) Not predictable

4. A 0.5 kg ball is thrown up with an initial speed 14 ms^{-1} and reaches a maximum height of 8 m. How much energy is dissipate by air drag acting on the ball during the ascent?
   a) 19.6 J b) 4.9 J c) 10 J d) 9.8 J

5. The height of the dam, in a hydroelectric power station is 10m. In order to generate 1 MW of electric power, the mass of water (in kg/s) that must fall per second on the blades of the turbines
   a) 10^6 b) 10^5 c) 10^3 d) 10^4

6. The potential energy of a particle of mass 5 kg moving in the x - y plane is given by $U = (-7x + 24y)$ J, x and y being in metre. If the particle starts from rest from origin then speed of particle at $t = 2$ s is
   a) 5 ms^{-1} b) 01 ms^{-1} c) 17.5 ms^{-1} d) 10 ms^{-1}

7. A rod AB of mass 10 kg and length 4 m 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

8. In the non-relativistic regime, if the momentum, is increased by 100%, the percentage increase in kinetic energy is
   a) 100 b) 200 c) 300 d) 400

9. A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2 :3. The smaller fragment moves with a velocity of 6 ms^{-1}. The kinetic energy of the larger fragment is
   a) 96 J b) 216 J c) 144 J d) 360 J

10. An α-particle of mass $m$suffers one dimensional elastic collision with a nucleus of unknown mass. After the collision the α-particle is scattered directly backward losing 75% of its kinetic energy .then the mass of the nucleus is
    a) m b) 2 m c) 3 m d) $\frac{3}{2}m$

11. A bomb of mass 30 kg at rest explodes into two pieces of masses 18 kg and 12kg.The velocity of 18 kg mass is 6 ms^{-1}.The kinetic energy of the other mass is
    a) 256 J b) 486 J c) 524 J d) 324 J

12. When a 1.0 kg mass hangs attached to a spring of length 50 cm, the spring stretches by 2 cm. The mass is pulled down until the length of the spring becomes 60 cm. What is the amount of elastic energy stored in the spring in this condition, if $g = 10\ m/s^2$
    a) 1.5 $joule$ b) 2.0 $joule$ c) 2.5 $joule$ d) 3.0 $joule$

13. A man pushes a wall and falls to displace it. He does
    a) Negative work b) Positive but not maximum work
    c) No work at all d) Maximum work

14. A spherical ball of mass 20 kg is stationary at the top of a hill of height 100 m. It rolls down a smooth surface to the ground, then climbs up another hill of height 30 m and height of 20 m above the ground. The velocity attained by the ball is
    a) 40 ms^{-1} b) 20 ms^{-1} c) 10ms^{-1} d) $10\sqrt{30}$ ms^{-1}

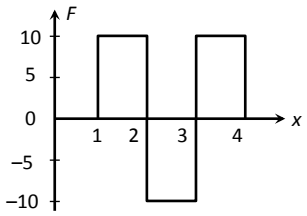
15. The potential energy of a certain spring when stretched through a distance s is 10 J. The amount of work (in joule) that must be done on this spring to stretch it through additional distance s will be
    a) 30 b) 40 c) 10 d) 20

16. A body of mass 3 kg acted upon by a constant force is displaced by s metre, given by relation $s = \frac{1}{3}t^2$, where t is in second. Work done by the force in 2 s
    a) $\frac{8}{3}$ J b) $\frac{19}{5}$ J c) $\frac{5}{19}$ J d) $\frac{3}{8}$ J

17. The force constant of a wire is k and that of another wire is $2k$. When both the wires are stretched through same distance, then the work done

a) $W_2 = 2W_1^2$ b) $W_2 = 2W_1$ c) $W_2 = W_1$ d) $W_2 = 0.5W_1$

18. Figure shows the F-x graph. Where F is the force applied and x is the distance covered



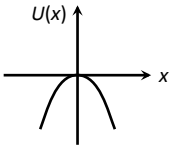
By the body along a straight line path. Given that F is in $newton$ and x in $metre$, what is the work done?

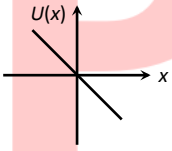
a) $10\ J$ b) $20\ J$ c) $30\ J$ d) $40\ J$

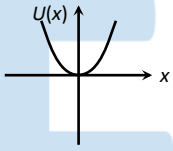
19. A particle is released from a height h, At a certain height; its KE is two times its potential energy. Height and speed of the particle at that instant are

a) $\frac{h}{3}, \sqrt{\frac{2gh}{3}}$ b) $\frac{h}{3}, 2\sqrt{\frac{gh}{3}}$ c) $\frac{2h}{3}\sqrt{\frac{2gh}{3}}$ d) $\frac{h}{3}, \sqrt{2gh}$

20. A particle is placed at the origin and a force $F = kx$ is acting on it (where k is positive constant). If $U(0) = 0$, the graph of $U(x)$ versus x will be (where U is the potential energy function)

a) 

b) 

c) 

d)