# DPP
DAILY PRACTICE PROBLEMS

**CLASS : XITH** **SUBJECT : PHYSICS**
**DATE :** **DPP NO. :1**

## Topic :- WORK ENERGY AND POWER

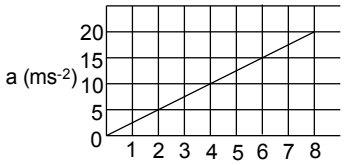
1. The kinetic energy of a body becomes four times its initial value. The new momentum will be
   a) Same as the initial value b) Twice the initial value
   c) Thrice the initial value d) Half of its initial value

2. If force and displacement of particle in direction of force are doubled. Work would be
   a) Double b) 4 times c) Half d) 1/4 times

3. A particle is released from a height $S$.At certain height its kinetic energy is three times its potential energy .The height and speed of the particle at that instant are respectively
   a) $\frac{S}{4}, \frac{3gS}{2}$ b) $\frac{S}{4}, \frac{\sqrt{3gS}}{2}$ c) $\frac{S}{2}, \frac{\sqrt{3gS}}{2}$ d) $\frac{S}{4}, \sqrt{\frac{3gS}{2}}$

4. A position dependent force $F = 7 - 2x + 3x^2$ $newton$ acts on a small body of mass 2 $kg$ and displaces it from $x = 0$ to $x = 5m$. The work done in $joules$ is
   a) 70 b) 270 c) 35 d) 135

5. A 10 kg brick moves along an $x$-axis. Its acceleration as a function of its position is shown in figure. What is the net work performed on the brick by the force causing the acceleration as the brick moves from $x = 0$ to $x = 8.0$m?




   a) 4 J b) 8 J c) 2 J d) 1 J

6. A long spring is stretched by 2 cm and its potential energy is U. If the spring is stretched by 10 cm; its potential energy will be
   a) U/5 b) U/25 c) 5 U d) 25 U

7. Two putty balls of equal mass moving with equal velocity in mutually perpendicular directions, stick together after collision. If the balls were initially moving with a velocity of $45\sqrt{2}$ $ms^{-1}$ each, the velocity of their combined after collision is

a) $45\sqrt{2}\ ms^{-1}$ b) $45\ ms^{-1}$ c) $90\ ms^{-1}$ d) $22.5\sqrt{2}\ ms^{-1}$

8. A particle free to move along the $x$-axis has potential energy given by $U(x) = k[1 - \exp(-x^2)]$ for $-\infty \leq x \leq +\infty$, where $k$ is a positive constant of appropriate dimensions. Then
   a) At point away from the origin, the particle is in unstable equilibrium
   b) For any finite non-zero value of $x$, there is a force directed away from the origin
   c) If its total mechanical energy is $k/2$, it has its minimum kinetic energy at the origin
   d) For small displacements from $x = 0$, the motion is simple harmonic

9. When a spring is stretched by a distance $x$,it exerts a force, given by $F = (-5x - 16x^3)$N
   The work done ,when the spring is stretched from 0.1 m to 0.2 m is
   a) $8.7 \times 10^{-2}$J b) $12.2 \times 10^{-2}$J c) $8.7 \times 10^{-1}$ J d) $12.2 \times 10^{-1}$J

10. In a head on elastic collision of a very heavy body moving at $v$ with a light body at rest, velocity of heavy body after collision is
    a) $v$ b) $2v$ c) Zero d) $\frac{v}{2}$

11. A bullet is fired from a rifle. If the riffle recoils freely, then the kinetic energy of the rifle is
    a) Less than that of the bullet b) More than that of the bullet
    c) Same as that of the bullet d) Equal or less than that of the bullet

12. A rubber ball is dropped from a height of 5 $m$ on a planet where the acceleration due to gravity is not known. On bouncing, it rises to1.8 $m$. The ball loses its velocity on bouncing by a factor of
    a) 16/25 b) 2/5 c) 3/5 d) 9/25

13. A running man has half the kinetic energy of that of a boy of half of his mass. The man speeds up by $1m/s$ so as to have same $K.E.$ as that of the boy. The original speed of the man will be
    a) $\sqrt{2}\ m/s$ b) $(\sqrt{2} - 1)\ m/s$ c) $\frac{1}{(\sqrt{2} - 1)} m/s$ d) $\frac{1}{\sqrt{2}}\ m/s$

14. A body of mass 10 kg is moving on a horizontal surface by applying a force of 10 N in forward direction. If body moves with constant velocity, the work done by force of fiction for a displacement of 2m is
    a) - 20 J b) 10 J c) 20 J d) - 5 J

15. An engine pumps up 100kg of water through a height of 10 m in 5 s. Given that the efficiency of engine is 60%.
    If g=$10ms^{-2}$,the power of the engine is
    a) 3.3 KW b) 0.33 KW c) 0.033KW d) 33KW

16. A rectangular plank of mass $m_1$ and height $a$ is kept on a horizontal surface. Another rectangular plank of mass $m_2$ and height $b$ is placed over the first plank. The gravitational potential energy of the system is

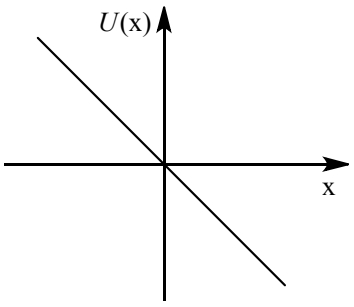
a) $m_1 + m_2(a + b)$ b) $\left[\frac{m_1 m_2}{2} a + m_2 \frac{b}{2}\right]$

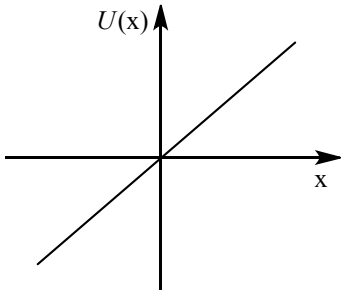
c) $\left[\left(\frac{m_1}{2} + m_2\right)a + m_2 \frac{b}{2}\right]$ d) $\left(\frac{m_1}{2} + m_2\right)a + m_1 \frac{b}{2}$

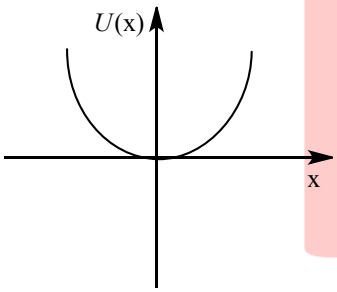
17. A ball of mass $m$ moves with speed $v$ and strikes a wall having infinite mass and it returns with same speed then the work done by the ball on the wall is

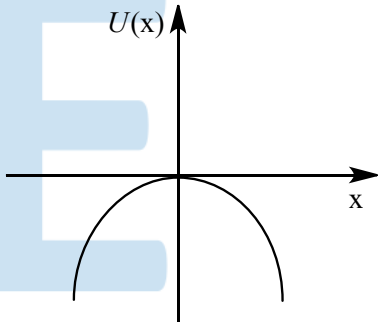
a) Zero b) $mv\ J$ c) $m/v.J$ d) $v/m\ J$

18. A particle is placed at the origin and force $F = kx$ is acting on it (where k is positive constant ).if $u(0) = 0$.the graph $u(x)$ versus x will (where u is potential energy function)

a) 


b) 


c) 


d) 


19. A bucket full of water weighs 5 kg, it is pulled from a well 20 m deep. There is a small hole in the bucket through which water leaks at a constant rate of $0.2 kgm^{-1}$ .The total work done in pulling the bucket up from the well is ($g = 10 ms^{-2}$)

a) 600 J b) 400 J c) 100 J d) 500 J

20. If a body of mass 200 $g$ falls from a height 200 $m$ and its total P.E. is converted into K.E. at the point of contact of the body with earth surface, then what is the decrease in P.E. of the body at the contact ( $g = 10\ m/s^2$)

a) 200 $J$ b) 400 $J$ c) 600 $J$ d) 900 $J$