# DPP
DAILY PRACTICE PROBLEMS

**CLASS : XITH** **SUBJECT : PHYSICS**
**DATE :** **DPP NO. : 9**

## Topic :- MOTION IN A PLANE

1. A motorcycle is going on an overbridge of radius $R$. The driver maintains a constant speed. As the motorcycle is ascending on the overbridge, the normal force on it
   a) Increases b) Decreases c) Remains the same d) Fluctuates

2. If $\vec{A}$ and $\vec{B}$ denote the sides of a parallelogram and its area is $\frac{1}{2}AB$($A$ and $B$ are the magnitude of $\vec{A}$ and $\vec{B}$ respectively), the angle between $\vec{A}$ and $\vec{B}$ is
   a) 30° b) 60° c) 45° d) 120°

3. Given $\vec{r} = 4\hat{j}$ and $\vec{p} = 2\hat{i} + 3\hat{j} + \hat{k}$. The angular momentum is
   a) $4\hat{i} - 8\hat{k}$ b) $8\hat{i} - 4\hat{k}$ c) $8\hat{j}$ d) $9\hat{k}$

4. The maximum and minimum tension in the string whirling in a circle of radius 2.5 $m$ with constant velocity are in the ratio 5:3 the the velocity is
   a) $\sqrt{98}\ m/s$ b) $7\ m/s$ c) $\sqrt{490}\ m/s$ d) $\sqrt{4.9}$

5. Two forces $\overrightarrow{F_1}$ and $\overrightarrow{F_2}$ are acting at right angles to each other. Then their resultant is
   a) $F_1 + F_2$ b) $\sqrt{F_1^2 + F_2^2}$ c) $\sqrt{F_1^2 - F_2^2}$ d) $\frac{F_1 + F_2}{2}$

6. If $a_r$ and $a_t$ represent radial and tangential accelerations, the motion of a particle will be uniformly circular if
   a) $a_r = 0, a_t = 0$ b) $a_r \neq 0, a_t \neq 0$ c) $a_r \neq 0, a_t = 0$ d) $a_r = 0, a_t \neq 0$

7. In the above question, if the angular velocity is kept same but the radius of the path is halved, the new force will be
   a) $2F$ b) $F^2$ c) $F/2$ d) $F/4$

8. If $\vec{A}, \vec{B}$ and $\vec{C}$ are the unit vectors along the incident ray, reflected ray and outward normal to the reflecting surface, then
   a) $\vec{B} = \vec{A} - \vec{C}$ b) $\vec{B} = \vec{A} + (\vec{A} \cdot \vec{C})\vec{C}$ c) $\vec{B} = 2\vec{A} - \vec{C}$ d) $\vec{B} = \vec{A} - 2(\vec{A} \cdot \vec{C})\vec{C}$

9. A stone of mass $m$ is tied to a string of length $l$ and rotated in a circle with a constant speed $v$. If the string is released, the stone flies
   a) Radially outwards
   b) Radially inwards
   c) Tangentially outwards
   d) With an acceleration $mv^2/l$

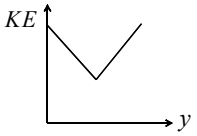
10. A particle is thrown with a speed $u$ at an angle θ with the horizontal. When the particle makes an angle α with the horizontal, its speed becomes $v$, whose values is
   a) $u$ cos θ
   b) $u$ cos θ cos α
   c) $u$ cos θ sec α
   d) $u$ sec θ cos α

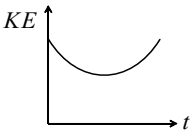
11. A bullet is fired horizontally with a velocity of 80 $ms^{-1}$. During the first second,
   a) It falls 9.8 m
   b) It falls $\frac{80}{9.8}$ m
   c) It does not fall at all
   d) It falls 4.9 m

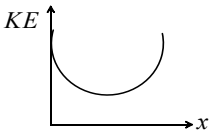
12. In a circus stuntman rides a motorbike in a circular track of radius $R$ in the vertical plane. The minimum speed at highest point of track will be
   a) $\sqrt{2gR}$
   b) $2gR$
   c) $\sqrt{3gR}$
   d) $\sqrt{gR}$

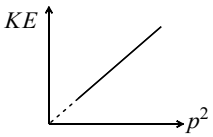
13. A particle is moving in a circular path with a constant speed $v$. If θ is the angular displacement, then starting from $\theta = 0°$, the maximum and maximum changes in the momentum will occur, when value of θ is respectively
   a) 45° and 90°
   b) 90° and 180°
   c) 180° and 360°
   d) 90° and 270°

14. An object is projected at an angle of 45° with the horizontal. The horizontal range and the maximum height reached will be in the ratio
   a) 1 :2
   b) 2 :1
   c) 1 :4
   d) 4 :1

15. A particle is projected up from a point at an angle $\theta$ with the horizontal direction. At any time $t'$. If $p$ is the linear momentum, $y$ is the vertical displacement, $x$ is horizontal displacement, the graph among the following which does not represent the variation of kinetic energy $KE$ of the particle
   a) 

   b) 

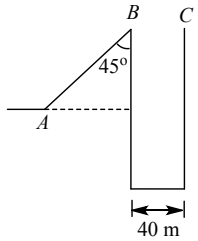
   c) 

   d) 


16. A weightless thread can bear tension upto 37 N. A. stone of mass 500 g is tied to it and revolved in a circular path of radius 4 m in a vertical plane. If g = 10 $ms^{-2}$, then the maximum angular velocity of the stone will be
   a) 2 rad $s^{-1}$
   b) 4 rad $s^{-1}$
   c) 8 rad $s^{-1}$
   d) 16 rad $s^{-1}$

17. A1 $kg$ stone at the end of 1 $m$ long string is whirled in a vertical circle at constant speed of 4 $m/sec$. The tension in the string is 6 $N$, when the stone is at ($g = 10\ m/\text{sec}^2$ )
   a) Top of the circle
   b) Bottom of the circle
   c) Half way down
   d) None of the above

18. A body is projected up a smooth inclined plane with a velocity $v_0$ from the point $A$ as shown in figure. The angle of inclination is 45° and top $B$ of the plane is connected to a well of diameter 40 m. If the body just manages to cross the well, what is the value of $v_0$? Length of the inclined plane is $20\sqrt{2}$m, and g = 10ms$^{-2}$




a) 20 ms$^{-1}$ b) $20\sqrt{2}$ms$^{-1}$ c) 40 ms$^{-1}$ d) $40\sqrt{2}$ ms$^{-1}$

19. A body moving along a circular path of radius $R$ with velocity $v$, has centripetal acceleration$a$. If its velocity is made equal to $2v$, then its centripetal acceleration is

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

20. In uniform circular motion

a) Both the angular velocity and the angular momentum vary
b) The angular velocity varies but the angular momentum remains constant
c) Both the angular velocity and the angular momentum stay constant
d) The angular momentum varies but the angular velocity remains constant