DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**

DATE : **DPP NO. : 10**

Topic :- MOTION IN A PLANE

1. A toy cyclist completes one round of a square track of side 2 m in 40 s. What will be the displacement at the end of 3 min?
   a) 52 m b) Zero c) 16 m d) $2\sqrt{2}$ m

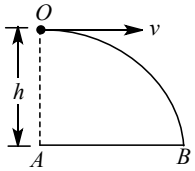
2. The X and Y components of vector $\vec{A}$ have numerical values 6 and 6 respectively and that of $(\vec{A} + \vec{B})$ have numerical values 10 and 9. What is the numerical value of $\vec{B}$?
   a) 2 b) 3 c) 4 d) 5

3. If $\vec{P} = 2\hat{i} - 3\hat{j} + \hat{k}$ and $\vec{Q} = 3\hat{i} - 2\hat{j}$, then $\vec{P} \cdot \vec{Q}$ is
   a) Zero b) 6 c) 12 d) 15

4. If the equation for the displacement of a particle moving on a circular path is given by $(\theta) = 2t^3 + 0.5$, where θ is in radians and t in seconds, then the angular velocity of the particle after 2 sec from its start is
   a) 8 rad/sec b) 12 rad/sec c) 24 rad/sec d) 36 rad/sec

5. Four persons K,L,M and N are initially at the corners of a square of side of length d. If every person starts moving, such that K is always headed towards L, L towards M,M is headed directly towards N and N towards K, then the four persons will meet after
   a) $\frac{d}{v}$ sec b) $\frac{\sqrt{2}d}{v}$ sec c) $\frac{d}{\sqrt{2}v}$ sec d) $\frac{d}{2v}$ sec

6. An aeroplane is flying in a horizontal direction with a velocity 600kmh^{-1} at a height of 1960 m. when it is vertically above the point A on the ground, a body is dropped from it. The body strikes the ground at point B. Calculate the distance AB.



   a) 3.33 km b) 333 km c) 33.3 km d) 3330 km

7. A car round an unbanked curve of radius 92 m without skidding at a speed of 26 ms^{-1}. The smallest possible coefficient of static friction between the tyres and the road is
a) 0.75 b) 0.60 c) 0.45 d) 0.30

8. A projectile is fired at an angle of 30° to the horizontal such that the vertical component of its initial velocity is 80 ms^{-1}. Its time of flight is T. Its velocity at $t = \frac{T}{4}$ has a magnitude of nearly
a) 200 ms^{-1} b) 300 ms^{-1} c) 140 ms^{-1} d) 100 ms^{-1}

9. A bomb is dropped from an aeroplane moving horizontally at constant speed. When air resistance is taken into consideration, the bomb
a) Falls to earth exactly below the aeroplane b) Fall to earth behind the aeroplane
c) Falls to earth ahead of the aeroplane d) Flies with the aeroplane

10. A body is thrown with a velocity of 10 ms^{-1} at an angle of 60° with the horizontal. Its velocity at the highest point is
a) 7 ms^{-1} b) 9 ms^{-1} c) 18.7 ms^{-1} d) 5 ms^{-1}

11. A bend in a level road has a radius of 80 m. Find the maximum speed which a car turning the bend may have without skidding, if $\mu = 0.25$
a) 24 ms^{-1} b) 4 ms^{-1} c) 14 ms^{-1} d) 9.8 ms^{-1}

12. Two vectors $\vec{a}$ and $\vec{b}$ are at an angle of 60° with each other. Their resultant makes an angle of 45 ° with $\vec{a}$. If $|\vec{b}| = 2$ units, then $|\vec{a}|$ is
a) $\sqrt{3}$ b) $\sqrt{3}$ - 1 c) $\sqrt{3} + 1$ d) $\sqrt{3}/2$

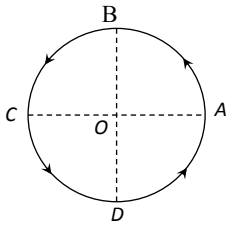
13. 

Figure shows a body of mass m moving with a uniform speed v along a circle of radius r. The change in velocity in going from A to B is
a) $v\sqrt{2}$ b) $v/\sqrt{2}$ c) v d) zero

14. A stone of mass 1 kg is tied to a string 4 m long and is rotated at constant speed of 40 ms^{-1} in a vertical circle. The ratio of the tension at the top and the bottom is
a) 11 : 12 b) 39 : 41 c) 41 : 39 d) 12 : 11

15. If the sum of the two unit vectors is also a unit vector, then magnitude of their difference is
a) $\sqrt{2}$ b) $\sqrt{3}$ c) $\sqrt{4}$ d) $\sqrt{7}$

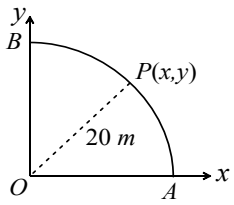
16. Two stones are projected from the same speed but making different angels with the horizontal. Their horizontal ranges are equal. The angle of projection of one is $\pi/3$ and the maximum height reached by it is 102 m. Then maximum height reached by the other in metre is

a) 336 b) 224 c) 56 d) 34

17. A particle of a mass m is projected with velocity v making an angle of 45° with the horizontal. The magnitude of the angular momentum of the particle about the point of projection when the particle is at its maximum height is (where $g =$ acceleration due to gravity)

a) Zero b) $mv^3/(4\sqrt{2}g)$ c) $mv^3/(\sqrt{2}g)$ d) $mv^2/2g$

18. A point P moves in counter-clockwise direction on a circular path as shown in the figure. The movement of $''P''$ is such that it sweeps out a length $s = t^3 + 5$, where s is in metres and t is in seconds. The radius of the path is 20 m. The acceleration of $''P''$ when $t = 2s$ is nearly



a) 14 m/s^2 b) 13 m/s^2 c) 12 m/s^2 d) 7.2 m/s^2

19. A man can thrown a stone 100 m away. The maximum height to which he can throw vertically is

a) 200 m b) 100 m c) 50 m d) 25 m

20. In a loop-the-loop, a body starts at a height $h = 2R$. The minimum speed with which the body must be pushed down initially in order that it may be able to complete the vertical circle is

a) $\sqrt{2gR}$ b) $\sqrt{gR}$ c) $\sqrt{3gR}$ d) $2\sqrt{gR}$