DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 2**

Topic :- VECTOR ALGEBRA

1. For any three vectors $\vec{a}, \vec{b}$ and $\vec{c}$, $(\vec{a}-\vec{b})\cdot(\vec{b}+\vec{c})\times(\vec{c}+\vec{a})$ is equal to
   a) $2\vec{a}\cdot(\vec{b}\times\vec{c})$ b) $[\vec{a}\,\vec{b}\,\vec{c}]$ c) $[\vec{a}\,\vec{b}\,\vec{c}]^2$ d) 0

2. If $\vec{a}, \vec{b}, \vec{c}$ are unit coplanar vectors, then $[2\vec{a}-\vec{b}\;2\vec{b}-\vec{c}\;2\vec{c}-\vec{a}]$ is equal to
   a) 1 b) 0 c) $-\sqrt{3}$ d) $\sqrt{3}$

3. If $\vec{a}$ and $\vec{b}$ are two unit vectors inclined to x-axis at anlges 30° and 120°, then $|\vec{a}+\vec{b}|$ equals
   a) $\sqrt{\frac{2}{3}}$ b) $\sqrt{2}$ c) $\sqrt{3}$ d) 2

4. If the vectors $i-2x\,j+3y\,k$ and $i+2xj-3yk$ perpendicular, then the locus of (x,y) is
   a) A circle b) An ellipse c) A hyperbola d) None of these

5. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be non-zero vectors such that $(\vec{a}\times\vec{b})\times\vec{c}=-\frac{1}{4}|\vec{b}||\vec{c}|\vec{a}$. If θ is the acute angle between vectors $\vec{b}$ and $\vec{c}$, then the angle between $\vec{a}$ and $\vec{c}$ is equal to
   a) $\frac{2\pi}{3}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{2}$

6. A vector perpendicular to both the vectors $\hat{i}+\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}$ is
   a) $\hat{i}+\hat{j}$ b) $\hat{i}-\hat{j}$ c) $c(\hat{i}-\hat{j})$, c is a scalar d) None of these

7. If $\vec{a}, \vec{b}, \vec{c}$ are non-collinear vectors such that $\vec{a}+\vec{b}$ is parallel to $\vec{c}$ and $\vec{c}+\vec{a}$ is parallel to $\vec{b}$, then
   a) $\vec{a}+\vec{b}=\vec{c}$
   b) $\vec{a}, \vec{b}, \vec{c}$ taken in order from the sides of a triangle
   c) $\vec{b}+\vec{c}=\vec{a}$
   d) None of these

8. A force of magnitude $\sqrt{6}$ acting along the line joining the points $A(2,-1,1)$ and $B(3,1,2)$ displaces a particle from A to B. The work done by the force is
   a) 6 b) $6\sqrt{6}$ c) $\sqrt{6}$ d) 12

9. A unit vector $\vec{a}$ makes an angle $\frac{\pi}{4}$ with z-axis, if $\vec{a}+\hat{i}+\hat{j}$ is a unit vector, then $\vec{a}$ is equal to
   a) $\frac{\hat{i}}{2}+\frac{\hat{j}}{2}+\frac{\hat{k}}{2}$ b) $\frac{\hat{i}}{2}+\frac{\hat{j}}{2}-\frac{\hat{k}}{\sqrt{2}}$ c) $-\frac{\hat{i}}{2}-\frac{\hat{j}}{2}+\frac{\hat{k}}{\sqrt{2}}$ d) $\frac{\hat{i}}{2}-\frac{\hat{j}}{2}-\frac{\hat{k}}{\sqrt{2}}$

10. If $|\vec{a} \times \vec{b}|^2 + |\vec{a} \cdot \vec{b}|^2 = 144$ and $|\vec{a}| = 4$ then $|\vec{b}|$ is equal to
a) 12 b) 3 c) 8 d) 4

11. If $\vec{a}$ is non-zero vector of modulus $|\vec{a}|$ and m is a non-zero scalar, then $m\,\vec{a}$ is a unit vector, if
a) $m = \pm 1$ b) $m = |\vec{a}|$ c) $m = \frac{1}{|\vec{a}|}$ d) $m = \pm 2$

12. If the constant forces $2\hat{\imath} - 5\hat{\jmath} + 6\hat{k}$ and $-\hat{\imath} + 2\hat{\jmath} - \hat{k}$ act on a particle due to which it is displaced from a point $A(4, -3, -2)$ to a point $B(6, 1, -3)$, then the work done by the forces is
a) 15 units b) -15 units c) 9 units d) -9 units

13. If P, Q, R are three points with respective position vectors $\hat{\imath} + \hat{\jmath}$, $\hat{\imath} - \hat{\jmath}$ and $a\hat{\imath} + b\hat{\jmath} + c\hat{k}$. The points P, Q, R are collinear, if
a) $a = b = c = 1$ b) $a = b = c = 0$ c) $a = 1, b, c \in R$ d) $a = 1, c = 0, b \in R$

14. The projection of the vector $\vec{a} = 4\hat{\imath} - 3\hat{\jmath} + 2\hat{k}$ on the axis making equal acute angles with the coordinate axes is
a) 3 b) $\sqrt{3}$ c) $\frac{3}{\sqrt{3}}$ d) None of these

15. The value of $\left[2\,\hat{\mathbf{i}}\;3\hat{\mathbf{j}} - 5\hat{\mathbf{k}}\right]$ is equal to
a) -30 b) -25 c) 0 d) 11

16. $(\vec{a} \times \vec{b}) \times (\vec{a} \times \vec{c}) \cdot \vec{d}$ equals
a) $[\vec{a}\vec{b}\vec{c}](\vec{b} \cdot \vec{d})$ b) $[\vec{a}\vec{b}\vec{c}](\vec{a} \cdot \vec{d})$ c) $[\vec{a}\vec{b}\vec{c}](\vec{c} \cdot \vec{d})$ d) None of these

17. If the constant force $2\hat{\mathbf{i}} - 5\hat{\mathbf{j}} + 6\hat{\mathbf{k}}$ and $-\hat{\mathbf{i}} + 2\hat{\mathbf{j}} - \hat{\mathbf{k}}$ act on a particle due to which it is displaced from a point $A(4, -3, -2)$ to a point $B(6,1, -3)$ then the work done by the force is
a) 10 units b) -10 units c) 9 units d) None of these

18. If forces of magnitudes 6 and 7 units acting in the directions $\hat{\imath} - 2\hat{\jmath} + 2\hat{k}$ and $2\hat{\imath} - 3\hat{\jmath} - 6\hat{k}$ respectively act on a particle which is displaced from the point $P(2, -1, -3)$ to $Q(5, -1, 1)$, then the work done by the forces is
a) 4 units b) -4 units c) 7 units d) -7 units

19. $[\vec{\mathbf{b}} \times \vec{\mathbf{c}}\;\; \vec{\mathbf{c}} \times \vec{\mathbf{a}}\;\; \vec{\mathbf{a}} \times \vec{\mathbf{b}}]$ is equal to
a) $[\,\vec{\mathbf{a}}\;\vec{\mathbf{b}}\;\vec{\mathbf{c}}\,]$ b) $2[\,\vec{\mathbf{a}}\;\vec{\mathbf{b}}\;\vec{\mathbf{c}}\,]$ c) $[\,\vec{\mathbf{a}}\;\vec{\mathbf{b}}\;\vec{\mathbf{c}}\,]^2$ d) $\vec{\mathbf{a}} \times (\vec{\mathbf{b}} \times \vec{\mathbf{c}})$

20. $ABCD$ is a quadrilateral , P, Q are the mid points of $\overrightarrow{\mathbf{BC}}$ and $\overrightarrow{\mathbf{AD}}$, then $\overrightarrow{\mathbf{AB}} + \overrightarrow{\mathbf{DC}}$ is equal to
a) $3\,\overrightarrow{\mathbf{QP}}$ b) $\overrightarrow{\mathbf{QP}}$ c) $4\overrightarrow{\mathbf{QP}}$ d) $2\overrightarrow{\mathbf{QP}}$