DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 10**

Topic :- VECTOR ALGEBRA

1. If C is the mid point of AB and P is any point outside AB, then
a) $\overrightarrow{\mathbf{PA}}+\overrightarrow{\mathbf{PB}}=\overrightarrow{\mathbf{PC}}$ b) $\overrightarrow{\mathbf{PA}}+\overrightarrow{\mathbf{PB}}+2\overrightarrow{\mathbf{PC}}=\vec{0}$ c) $\overrightarrow{\mathbf{PA}}+\overrightarrow{\mathbf{PB}}-2\overrightarrow{\mathbf{PC}}=\vec{0}$ d) $\overrightarrow{\mathbf{PA}}+\overrightarrow{\mathbf{PB}}+2\overrightarrow{\mathbf{PC}}=\vec{0}$

2. The vector equation of the line passing through the points (3,2,1) and $(-2,1,3)$ is
a) $\vec{\mathbf{r}}=3\hat{\mathbf{i}}+2\hat{\mathbf{j}}+\hat{\mathbf{k}}+\lambda(-5\hat{\mathbf{i}}-\hat{\mathbf{j}}+2\hat{\mathbf{k}})$ b) $\vec{\mathbf{r}}=3\hat{\mathbf{i}}+2\hat{\mathbf{j}}+\hat{\mathbf{k}}+\lambda(-5\hat{\mathbf{i}}+\hat{\mathbf{j}}+\hat{\mathbf{k}})$
c) $\vec{\mathbf{r}}=-2\hat{\mathbf{i}}+\hat{\mathbf{j}}+3\hat{\mathbf{k}}+\lambda(5\hat{\mathbf{i}}+\hat{\mathbf{j}}+2\hat{\mathbf{k}})$ d) $\vec{\mathbf{r}}=-2\hat{\mathbf{i}}+\hat{\mathbf{j}}+\hat{\mathbf{k}}+\lambda(5\hat{\mathbf{i}}+\hat{\mathbf{j}}+2\hat{\mathbf{k}})$

3. The angle between $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ is $\frac{5\pi}{6}$ and the projection of $\vec{\mathbf{a}}$ in the direction of $\vec{\mathbf{b}}$ is $\frac{-6}{\sqrt{3}}$ then $|\vec{\mathbf{a}}|$ is equal to
a) 6 b) $\sqrt{3}/2$ c) 12 d) 4

4. When a right handed rectangular cartesian system $OXYZ$ rotated about z-axis through $\pi/4$ in the counter-clock-wise sense it is found that a vector $\vec{r}$ has the components $2\sqrt{2}, 3\sqrt{2}$ and 4. The components of $\vec{a}$ in the $OXYZ$ coordinate system are
a) $5,-1,4$ b) $5,-1,4\sqrt{2}$ c) $-1,-5,4\sqrt{2}$ d) None of these

5. If $\vec{\mathbf{x}}\cdot\vec{\mathbf{a}}=\vec{\mathbf{x}}\cdot\vec{\mathbf{b}}=\vec{\mathbf{x}}\cdot\vec{\mathbf{c}}=0$ where $\vec{\mathbf{x}}$ is a non-zero vector. Then, $[\vec{\mathbf{a}}\times\vec{\mathbf{b}}\ \ \vec{\mathbf{b}}\times\vec{\mathbf{c}}\ \ \vec{\mathbf{c}}\times\vec{\mathbf{a}}]$ is equal to
a) $[\vec{\mathbf{x}}\,\vec{\mathbf{a}}\,\vec{\mathbf{b}}]^2$ b) $[\vec{\mathbf{x}}\,\vec{\mathbf{b}}\,\vec{\mathbf{c}}]^2$ c) $[\vec{\mathbf{x}}\,\vec{\mathbf{c}}\,\vec{\mathbf{a}}]^2$ d) 0

6. If $ABCDEF$ is regular hexagon, then $\overrightarrow{\mathbf{AD}}+\overrightarrow{\mathbf{EB}}+\overrightarrow{\mathbf{FC}}$ is equal to
a) 0 b) $2\,\overrightarrow{\mathbf{AB}}$ c) $3\,\overrightarrow{\mathbf{AB}}$ d) $4\,\overrightarrow{\mathbf{AB}}$

7. The shortest distance between the straight lines through the points $A_1=(6,2,2)$ and $A_2=(-4,0,-1)$ in the directions of $(1,-2,2)$ and $(3,-2,-2)$ is
a) 6 b) 8 c) 12 d) 9

8. A unit vector perpendicular to the plane of $\vec{\mathbf{a}}=2\hat{\mathbf{i}}-6\hat{\mathbf{j}}-3\hat{\mathbf{k}}$ and $\vec{\mathbf{b}}=4\hat{\mathbf{i}}+3\hat{\mathbf{j}}-\hat{\mathbf{k}}$ is
a) $\frac{4\hat{\mathbf{i}}+3\hat{\mathbf{j}}-\hat{\mathbf{k}}}{\sqrt{26}}$ b) $\frac{2\hat{\mathbf{i}}-6\hat{\mathbf{j}}-3\hat{\mathbf{k}}}{7}$ c) $\frac{3\hat{\mathbf{i}}-2\hat{\mathbf{j}}+6\hat{\mathbf{k}}}{7}$ d) $\frac{2\hat{\mathbf{i}}-3\hat{\mathbf{j}}-6\hat{\mathbf{k}}}{7}$

9. If $\vec{a},\vec{b},\vec{c}$ and $\vec{d}$ are the position vectors of points A,B,C,D such that no three of them are collinear and $\vec{a}+\vec{c}=\vec{b}+\vec{d}$, then $ABCD$ is a
a) Rhombus b) Rectangle c) Square d) Parallelogram

10. If D,E,F are respectively the mid point of AB, AC and BC in $\Delta\, ABC$, then $\overrightarrow{\mathbf{BE}} + \overrightarrow{\mathbf{AF}}$ is equal to

a) $\overrightarrow{\mathbf{DC}}$ b) $\frac{1}{2}\overrightarrow{\mathbf{BF}}$ c) $2\,\overrightarrow{\mathbf{BF}}$ d) $\frac{3}{2}\overrightarrow{\mathbf{BF}}$

11. Let $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ be two unit vectors such that angle between them is $60°$. Then, $|\vec{\mathbf{a}} - \vec{\mathbf{b}}|$ is equal to

a) $\sqrt{5}$ b) $\sqrt{3}$ c) 0 d) 1

12. If $2\vec{\mathbf{a}} + 3\vec{\mathbf{b}} + \vec{\mathbf{c}} = \vec{\mathbf{0}}$, then $\vec{\mathbf{a}} \times \vec{\mathbf{b}} + \vec{\mathbf{b}} \times \vec{\mathbf{c}} + \vec{\mathbf{c}} \times \vec{\mathbf{a}}$ is equal to

a) $6(\vec{\mathbf{b}} \times \vec{\mathbf{c}})$ b) $3(\vec{\mathbf{b}} \times \vec{\mathbf{c}})$ c) $2(\vec{\mathbf{b}} \times \vec{\mathbf{c}})$ d) $\vec{\mathbf{0}}$

13. If $\vec{\mathbf{a}}, \vec{\mathbf{b}}, \vec{\mathbf{c}}$ are the three vectors mutually perpendicular to each other and $|\vec{\mathbf{a}}| = 1, |\vec{\mathbf{b}}| = 3$ and $|\vec{\mathbf{c}}| = 5$, then $[\vec{\mathbf{a}} - 2\,\vec{\mathbf{b}}\;\vec{\mathbf{b}} - 3\vec{\mathbf{c}}\;\;\vec{\mathbf{c}} - 4\vec{\mathbf{a}}\,]$ is equal to

a) 0 b) -24 c) 3600 d) -215

14. If the area of the parallelogram with $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ as two adjacent side is 15 sq units, then the area of the parallelogram having $3\vec{\mathbf{a}} + 2\vec{\mathbf{b}}$ and $\vec{\mathbf{a}} + 3\vec{\mathbf{b}}$ as two adjacent sides in sq units is

a) 120 b) 105 c) 75 d) 45

15. If $(\vec{a} \times \vec{b}) + (\vec{a}.\vec{b})^2 = 144$ and $|\vec{a}| = 4$, then $|\vec{b}| =$

a) 16 b) 8 c) 3 d) 12

16. If the vectors $\vec{c}$, $\vec{a} = x\hat{i} + y\hat{i} + z\hat{k}$ and $\vec{b} = \hat{j}$ are such that $\vec{a}$, $\vec{c}$ and $\vec{b}$ form a right handed system, then $\vec{c}$ is

a) $z\hat{i} - x\hat{k}$ b) $\vec{0}$ c) $y\hat{i}$ d) $-z\hat{i} + x\hat{k}$

17. The vectors $2\hat{i} - m\hat{j} + 3m\hat{k}$ and $(1+m)\hat{i} - 2m\hat{j} + \hat{k}$ include an acute angle for

a) $m = -1/2$
b) $m \in [-2, -1/2]$
c) $m \in R$
d) $m \in (-\infty, -2) \cup (-1/2, \infty)$

18. If $|\vec{\mathbf{a}}| + 3, |\vec{\mathbf{a}}| = 4, |\vec{\mathbf{c}}| = 5$ and $\vec{\mathbf{a}}, \vec{\mathbf{b}}, \vec{\mathbf{c}}$ are such that each is perpendicular to the saum of other two, then $|\vec{\mathbf{a}} + \vec{\mathbf{b}} + \vec{\mathbf{c}}|$ is

a) $5\sqrt{2}$ b) $\frac{5}{\sqrt{2}}$ c) $10\sqrt{2}$ d) $10\sqrt{3}$

19. For any three vectors $\vec{a}, \vec{b}, \vec{c}$, the vector $(\vec{b} \times \vec{c}) \times \vec{a}$ equals

a) $(\vec{a} \cdot \vec{b})\vec{c} - (\vec{b} \cdot \vec{c})\vec{a}$ b) $(\vec{a} \cdot \vec{b})\vec{c} - (\vec{a} \cdot \vec{c})\vec{b}$ c) $(\vec{b} \cdot \vec{a})\vec{c} - (\vec{c} \cdot \vec{a})\vec{b}$ d) None of these

20. The vector $\cos\alpha\cos\beta\hat{i} + \cos\alpha\sin\beta\hat{j} + \sin\alpha\hat{k}$ is a

a) Null vector b) Unit vector c) Constant vector d) None of these