DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth — **SUBJECT : MATHS**

DATE : — **DPP NO. : 1**

Topic :- VECTOR ALGEBRA

1. If $\vec{a}+\vec{b}+\vec{c}=0$, $|\vec{a}|=3$, $|\vec{b}|=5$, $|\vec{c}|=7$, then the angle between $\vec{a}$ and $\vec{b}$ is

a) $\pi/6$ b) $2\pi/3$ c) $5\pi/3$ d) $\pi/3$

2. If $\vec{\mathbf{a}}$ is perpendicular to $\vec{\mathbf{b}}$ and $\vec{\mathbf{c}}|\vec{\mathbf{a}}|=2$, $|\vec{\mathbf{b}}|=3$, $|\vec{\mathbf{c}}|=4$ and the angle between $\vec{\mathbf{b}}$ and $\vec{\mathbf{c}}$ is $\frac{2\pi}{3}$, then $[\vec{\mathbf{a}}\,\vec{\mathbf{b}}\,\vec{\mathbf{c}}]$ is equal to

a) $4\sqrt{3}$ b) $6\sqrt{3}$ c) $12\sqrt{3}$ d) $18\sqrt{3}$

3. The position vectors of the points A,B,C are $(2\hat{\mathbf{i}}+\hat{\mathbf{j}}-\hat{\mathbf{k}})$, $(3\hat{\mathbf{i}}-2\hat{\mathbf{j}}+\hat{\mathbf{k}})$ and $(\hat{\mathbf{i}}+4\hat{\mathbf{j}}-3\hat{\mathbf{k}})$ respectively. These points

a) Form an isosceles triangle b) Form a right angled triangle

c) Are collinear d) Form a scalene triangle

4. If $\vec{a}=4\hat{i}+6\hat{j}$ and $\vec{b}=3\hat{j}+4\hat{k}$, then the vector form of component of $\vec{a}$ along $\vec{b}$ is

a) $\frac{18}{10\sqrt{3}}(3\hat{j}+4\hat{k})$ b) $\frac{18}{25}(3\hat{j}+4\hat{k})$ c) $\frac{18}{\sqrt{3}}(3\hat{j}+4\hat{k})$ d) $3\hat{j}+4\hat{k}$

5. Two vectors $\vec{a}$ and $\vec{b}$ are non-collinear. If vectors $\vec{c}=(x-2)\vec{a}+\vec{b}$ and $\vec{d}=(2x+1)\vec{a}-\vec{b}$ are collinear, then $x=$

a) $1/3$ b) $1/2$ c) 1 d) 0

6. Through the point $P(\alpha,\beta,\gamma)$ a plane is drawn at right angles to OP to meet the coordinate axes are A,B,C respectively. If $OP=p$ then equation of plane $\overrightarrow{A,B,C}$ is

a) $\alpha x+\beta y+\gamma z=p$ b) $\frac{x}{\alpha}+\frac{y}{\beta}+\frac{z}{\gamma}=p$

c) $2\alpha x+2\beta y+2\gamma z=p^2$ d) $\alpha x+\beta y+\gamma z=p^2$

7. If $ABCDEF$ is a regular hexagon with $\overrightarrow{\mathbf{AB}}=\vec{\mathbf{a}}$ and $\overrightarrow{\mathbf{BC}}=\vec{\mathbf{b}}$, then $\overrightarrow{\mathbf{CE}}$ equals

a) $\vec{\mathbf{b}}-\vec{\mathbf{a}}$ b) $-\vec{\mathbf{b}}$ c) $\vec{\mathbf{b}}-2\vec{\mathbf{a}}$ d) None of these

8. A unit vector perpendicular to both $\hat{i}+\hat{j}$ and $\hat{j}+\hat{k}$, is

a) $\hat{i}-\hat{j}+\hat{k}$ b) $\hat{i}+\hat{j}+\hat{k}$ c) $\frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$ d) $\frac{\hat{i}-\hat{j}+\hat{k}}{\sqrt{3}}$

9. Let $ABCD$ be the parallelogram whose sides AB and AD are represented by the vectors

$2\hat{\mathbf{i}}+4\hat{\mathbf{j}}-5\hat{\mathbf{k}}$ and $\hat{\mathbf{i}}+2\hat{\mathbf{j}}+3\hat{\mathbf{k}}$ respectively. Then, if $\vec{\mathbf{a}}$ is a unit vector parallel to $\overrightarrow{\mathbf{AC}}$, then $\vec{\mathbf{a}}$ equal to

a) $\frac{1}{3}(3\hat{\mathbf{i}}-6\hat{\mathbf{j}}-2\hat{\mathbf{k}})$ b) $\frac{1}{3}(3\hat{\mathbf{i}}+6\hat{\mathbf{j}}+2\hat{\mathbf{k}})$ c) $\frac{1}{7}(3\hat{\mathbf{i}}-6\hat{\mathbf{j}}-3\hat{\mathbf{k}})$ d) $\frac{1}{7}(3\hat{\mathbf{i}}+6\hat{\mathbf{j}}-2\hat{\mathbf{k}})$

10. The value of b such that the scalar product of the vector $\hat{i}+\hat{j}+\hat{k}$ with the unit vector parallel to the sum of the vectors $2\hat{i}+4\hat{j}-5\hat{k}$ and $b\hat{i}+2\hat{j}+3\hat{k}$ is one, is

a) -2 b) -1 c) 0 d) 1

11. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and $x\vec{a}+y\vec{b}+z\vec{c}=0$, then

a) At least of one of x,y,z is zero
b) x,y,z are necessarily zero
c) None of them are zero
d) None of these

12. The ratio in which $\hat{i}+2\hat{j}+3\hat{k}$ divides the join of $-2\hat{i}+3\hat{j}+5\hat{k}$ and $7\hat{i}-\hat{k}$, is

a) 1 : 2 b) 2 : 3 c) 3 : 4 d) 1 : 4

13. For any three vectors $\vec{a},\vec{b},\vec{c}$ the expression $(\vec{a}-\vec{b})\cdot\{(\vec{b}-\vec{c})\times(\vec{c}-\vec{a})\}$ equals

a) $[\vec{a}\vec{b}\vec{c}]$ b) $2[\vec{a}\vec{b}\vec{c}]$ c) $[\vec{a}\vec{b}\vec{c}]^2$ d) None of these

14. The point of intersection of the lines $\vec{\mathbf{r}}=7\hat{\mathbf{i}}+10\hat{\mathbf{j}}+3\hat{\mathbf{k}}+s(2\hat{\mathbf{i}}+3\hat{\mathbf{j}}+4\hat{\mathbf{k}})$ and $\vec{\mathbf{r}}=3\hat{\mathbf{i}}+5\hat{\mathbf{j}}+7\hat{\mathbf{k}}+t(\hat{\mathbf{i}}+2\hat{\mathbf{j}}+3\hat{\mathbf{k}})$ is

a) $\hat{\mathbf{i}}+\hat{\mathbf{j}}-\hat{\mathbf{k}}$ b) $2\hat{\mathbf{i}}-\hat{\mathbf{j}}+4\hat{\mathbf{k}}$ c) $\hat{\mathbf{i}}-\hat{\mathbf{j}}+\hat{\mathbf{k}}$ d) $\hat{\mathbf{i}}+\hat{\mathbf{j}}+\hat{\mathbf{k}}$

15. let $\vec{p}$ and $\vec{q}$ be the position vectors of P and Q respectively, with respect to O and $|\vec{p}|=p$, $|\vec{q}|=q$. The points R and S divide PQ internally and externally in the ratio 2 : 3 respectively. If $\overrightarrow{OR}$ and $\overrightarrow{OS}$ are perpendicular, then

a) $9p^2=4q^2$ b) $4p^2=9q^2$ c) $9p=4q$ d) $4p=9q$

16. If $\vec{\mathbf{a}}=\hat{\mathbf{i}}+\hat{\mathbf{j}}$ and $\vec{\mathbf{b}}=2\hat{\mathbf{i}}-\hat{\mathbf{k}}$ are two vectors, then the point of intersection of two lines $\vec{\mathbf{r}}\times\vec{\mathbf{a}}=\vec{\mathbf{b}}\times\vec{\mathbf{a}}$ and $\vec{\mathbf{r}}\times\vec{\mathbf{b}}=\vec{\mathbf{a}}\times\vec{\mathbf{b}}$ is

a) $\hat{\mathbf{i}}+\hat{\mathbf{j}}-\hat{\mathbf{k}}$ b) $\hat{\mathbf{i}}-\hat{\mathbf{j}}+\hat{\mathbf{k}}$ c) $3\hat{\mathbf{i}}+\hat{\mathbf{j}}-\hat{\mathbf{k}}$ d) $3\hat{\mathbf{i}}-\hat{\mathbf{j}}+\hat{\mathbf{k}}$

17. If $\vec{\mathbf{A}}\times(\vec{\mathbf{B}}\times\vec{\mathbf{C}})=\vec{\mathbf{B}}\times(\vec{\mathbf{C}}\times\vec{\mathbf{A}})$ and $[\vec{\mathbf{A}}\,\vec{\mathbf{B}}\,\vec{\mathbf{C}}]\neq 0$, then $\vec{\mathbf{A}}\times(\vec{\mathbf{B}}\times\vec{\mathbf{C}})$is equal to

a) $\vec{\mathbf{0}}$ b) $\vec{\mathbf{A}}\times\vec{\mathbf{B}}$ c) $\vec{\mathbf{B}}\times\vec{\mathbf{C}}$ d) $\vec{\mathbf{C}}\times\vec{\mathbf{A}}$

18. If $\vec{a}$ and $\vec{b}$ are two vectors, then the equality $|\vec{a}+\vec{b}|=|\vec{a}|+|\vec{b}|$ holds

a) Only if $\vec{a}=\vec{b}=\vec{0}$
b) For all $\vec{a},\vec{b}$
c) Only if $\vec{a}=\lambda\vec{b}$, $\lambda>0$ or $\vec{a}=\vec{b}=\vec{0}$
d) None of these

19. Let $\vec{\mathbf{a}}=\hat{\mathbf{i}}-\hat{\mathbf{k}}$, $\vec{\mathbf{b}}=x\hat{\mathbf{i}}+\hat{\mathbf{j}}+(1-x)\hat{\mathbf{k}}$ and $\vec{\mathbf{c}}=y\hat{\mathbf{i}}+x\hat{\mathbf{j}}+(1+x-y)\hat{\mathbf{k}}$. Then $[\vec{\mathbf{a}},\vec{\mathbf{b}},\vec{\mathbf{c}}]$ depends on

a) neither x nor y b) both x and y c) only x d) only y

20. If the position vectors of three points A, B, C are respectively $\hat{i} + \hat{j} + \hat{k}$, $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $7\hat{i} + 4\hat{j} + 9\hat{k}$, then the unit vector perpendicular to the plane of triangle ABC is

a) $31\hat{i} - 18\hat{j} - 9\hat{k}$ b) $\frac{31\hat{i} - 38\hat{j} - 9\hat{k}}{\sqrt{2486}}$ c) $\frac{31\hat{i} + 38\hat{j} + 9\hat{k}}{\sqrt{2486}}$ d) None of these