Class 12th Mathematics

1. D.C.'s of two lines are (l_1, m_1, n_1) and (l_2, m_2, n_2) then D.C.'s of the line perpendicular to both lines are

(a) $(m_1n_2 - m_2n_1,\ n_1l_2 - n_2l_1, m_2l_1 - l_2m_1)$ (b) $(l_1 + l_2, m_1 + m_2, n_1 + n_2)$

(c) $(l_1 - l_2, m_1 - m_2, n_1 - n_2)$ (d) none of these

2. The equation of the line passing through the point (1, 2, 3) and perpendicular to $x + 2y - 5z + 9 = 0$ is

(a) $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{-5}$ (b) $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z+5}{3}$

(c) $\frac{x+1}{1} = \frac{y+2}{2} = \frac{z+3}{-5}$ (d) $\frac{x+1}{1} = \frac{y+2}{2} = \frac{z-5}{3}$

3. The length of the perpendicular from the origin to the plane passing through the point $\vec{a}$ and containing the line $\vec{r} = \vec{b} + \lambda\vec{c}$ is

(a) $\frac{[\vec{a}\ \vec{b}\ \vec{c}]}{[\vec{a}\times\vec{b} + \vec{b}\times\vec{c} + \vec{c}\times\vec{a}]}$ (b) $\frac{[\vec{a}\ \vec{b}\ \vec{c}]}{[\vec{a}\times\vec{b} + \vec{b}\times\vec{c}]}$

(c) $\frac{[\vec{a}\ \vec{b}\ \vec{c}]}{[\vec{b}\times\vec{c} + \vec{c}\times\vec{a}]}$ (d) $\frac{[\vec{a}\ \vec{b}\ \vec{c}]}{[\vec{c}\times\vec{a} + \vec{a}\times\vec{b}]}$

4. The vertices of a tetrahedron are O(0,0,0), A(1, 2,1), B(2,1,3) and C(−1, 1, 2), the angle between faces OAB and ABC is

(a) $\cos^{-1}\left(\frac{19}{35}\right)$ (b) $\cos^{-1}\left(\frac{17}{31}\right)$ (c) 30° (d) 90°

5. A line joining points (4, −1, 2) and (−3, 2, 3) meets the plane at the point (−10, 5, 4) at 90°, then equation of the plane is

(a) $7x - 3y - z + 89 = 0$ (b) $7x + 3y + z + 89 = 0$

(c) $7x - 3y + z + 89 = 0$ (d) none of these

6. A line passes through two points A(2, −3, −1) and B(8, −1, 2). The coordinates of a point on this line at a distance of 14 units form A are

(a) (14, 1, 5) (b) (−10, −7, −7) (c) (86, 25, 41) (d) none of these

7. The ratio in which *yz* plane cuts the line joining the point (−2, 4, 7) and (3, −5, 8) is

(a) 2: 3 (b) 3: 2 (c) −2:3 (d) 4:−3

8. The angle between lines whose D.C's satisfy the following equations $l + m + n = 0$, $l^2 + m^2 - n^2 = 0$ is

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{5\pi}{6}$ (d) $\frac{\pi}{3}$

9. If O is the origin and A is any point (a,b,c) the equation of plane passing through A and perpendicular to OA is

(a) $a(x-a) - b(y-b) - c(z-c) = 0$ (b) $a(x+a) + b(y+b) + c(z+c) = 0$

(c) $a(x-a) + b(y-b) + c(z-c) = 0$ (d) none of these

10. The equation of the plane which passes through the points (2, 3, –4) and (1, –1, 3) and parallel to x–axis is
(a) $7y-4z-5=0$ (b) $4y-7z-5=0$
(c) $4y+7z+5=0$ (d) $7y+4z-5=0$

11. The vector equation of plane passing through three on–collinear points having position vectors , $\vec{a},\vec{b},\vec{c}$
(a) $\vec{r}.(\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a})=0$ (b) $\vec{r}\times(\vec{a}\times\vec{b}+\vec{b}\times\vec{c})=[\vec{a}\,\vec{b}\,\vec{c}]$
(c) $\vec{r}.(\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a})+[\vec{a}\,\vec{b}\,\vec{c}]=0$ (d) none of these

12. The vector equation of the plane through the point $2\hat{i}-\hat{j}-4\hat{k}$ and parallel to the plane $\vec{r}.(4\hat{i}-12\hat{j}-3\hat{k})-7=0$ is
(a) $\vec{r}.(4\hat{i}-12\hat{j}-3\hat{k})=0$ (b) $\vec{r}.(4\hat{i}-12\hat{j}-3\hat{k})=32$
(c) $\vec{r}.(4\hat{i}-12\hat{j}-3\hat{k})=12$ (d) none of these

13. A straight line $\vec{r}=\vec{a}+\lambda\vec{b}$ meets the plane $\vec{r}\,.\vec{n}=0$ in P. The position vector of P is
(a) $\vec{a}+\left(\frac{\vec{a}\,.\vec{n}}{\vec{b}\,.\vec{n}}\right)\vec{b}$ (b) $\vec{a}-\left(\frac{\vec{a}\,.\vec{n}}{\vec{b}\,.\vec{n}}\right)\vec{a}$ (c) $a-\left(\frac{\vec{a}.\vec{n}}{\vec{b}.\vec{n}}\right)\vec{b}$ (d) none of these

14. A line makes angles α , β, γ,δ with four diagonals of a cube then, $\cos^2\alpha+\cos^2\beta+\cos^2\gamma+\cos^2\delta=$
(a) $\frac{2}{3}$ (b) $\frac{4}{3}$ (c) $\frac{8}{3}$ (d) $\frac{1}{3}$

15. If $\vec{a},\vec{b}$, $\vec{c}$ are three non–coplanar vectors such that $\vec{r}_1=\vec{a}-\vec{b}+\vec{c}$, $\vec{r}_2=\vec{b}+\vec{c}-\vec{a}$, $\vec{r}_3=\vec{c}+\vec{a}+\vec{b}$, $\vec{r}=2\vec{a}-3\vec{b}+4\vec{c}$. If $\vec{r}=\lambda_1\vec{r}_1+\lambda_2\vec{r}_2+\lambda_3\vec{r}_3$, then
(a) $\lambda_1=7$ (b) $\lambda_1+\lambda_2=3$ (c) $\lambda_1+\lambda_2+\lambda_3=4$ (d) $\lambda_2+\lambda_3=2$

16. If $\vec{p}=\lambda(\vec{u}\times\vec{v})+\mu(\vec{v}\times\vec{w})+\nu(\vec{w}\times\vec{u})$ and $[\vec{u}\ \vec{v}\ \vec{w}]=\frac{1}{5}$,then $\lambda+\mu+\nu$ is equal to
(a) 5 (b) 10 (c) 15 (d) none of these

17. Two sides of a traingle are formed by the vectors $\vec{a}=3\hat{i}+6\hat{j}-2\hat{k}$ and $\vec{b}=4\hat{i}-\hat{j}+3\hat{k}$. The angles of the traingle are
(I) $\cos^{-1}\frac{7}{\sqrt{75}}$ (II) $\cos^{-1}\sqrt{\frac{26}{75}}$ (III) $\cos^{-1}\frac{3}{\sqrt{15}}$ (IV) $\cos^{-1}\frac{2}{3}$
(a) I & III (b) II & III (c) III & IV (d) I & II

18. $(\vec{a}\times\hat{i})+(\vec{a}\times\hat{j})^2+(\vec{a}\times\hat{k})^2$ is equal to
(a) $\vec{a}^2$ (b) $3\vec{a}^2$ (c) $2\vec{a}^2$ (d) none of these

19. If $\hat{i}\times(\vec{r}\times\hat{i})+\hat{j}\times(\vec{r}\times\hat{j})+\hat{k}\times(\vec{r}\times\hat{k})=\vec{a}\times\vec{b}$ $(\vec{a}\neq0,\vec{b}\neq0)$, then
(a) $\vec{r}=\vec{a}\times\vec{b}$ (b) $\vec{r}=\frac{\vec{a}\times\vec{b}}{2}$ (c) $\vec{r}=\vec{0}$ (d) none of these

20. If $\vec{a}+\vec{b}+\vec{c}=\alpha\vec{d}$, $\vec{b}+\vec{c}+\vec{d}=\beta\vec{a}$, then $\vec{a}+\vec{b}+\vec{c}+\vec{d}$ is equal to

(a) $\beta\vec{b}$ (b) $\alpha\vec{a}$ (c) $\vec{0}$ (d) none of these

21. A five digit number is chosen at random. The probability that all the digit are distinct and digits at odd places are odd and digits at even place are even, is

a) $\frac{1}{60}$ b) $\frac{2}{75}$ c) $\frac{1}{50}$ d) $\frac{1}{75}$

22. If two dice are thrown together, then the probability that the sum of numbers appearing on them is 9, is

a) $\frac{1}{9}$ b) $\frac{1}{6}$ c) $\frac{1}{4}$ d) $\frac{1}{3}$

23. A man is known to speak truth in 75% cases. If he throws an unbiased die and tells his friend that it is a six, then the probability that it is actually a six, is

a) 1/6 b) 1/8 c) 3/4 d) 3/8

24. A box contains 10 mangoes out of which 4 are rotten. 2 mangoes are taken out together. If one of them is found to be good, the probability that the other is also good is

a) 1/3 b) 8/15 c) 5/13 d) 2/3

25. There are 4 white and 4 black balls in a bag and 3 balls are drawn at random. If balls of same colour are identical, the probability that none of them is black, is

a) 1/4 b) 1/14 c) 1/2 d) None of these

ANSWER KEY

1. (A)	2. (A)	3. (C)	4. (A)	5. (A)	6. (A)	7. (A)
8. (D)	9. (C)	10. (D)	11. (D)	12. (B)	13. (C)	14. (B)
15. (C)	16. (D)	17. (D)	18. (C)	19. (D)	20. (C)	21. (D)
22. (A)	23. (D)	24. (C)	25. (A)			