3 D -I

1. The direction rations of two lines are 3, 2, -6 and 1, 2, 2 respectively. The acute angle Between these lines is

   (a) $\cos^{-1}\left(\frac{5}{18}\right)$ (b) $\cos^{-1}\left(\frac{3}{20}\right)$ (c) $\cos^{-1}\left(\frac{5}{21}\right)$ (d) $\cos^{-1}\left(\frac{8}{21}\right)$

2. The direction rations of two lines are a, b, c and (b – c), (c- a), (a – b) respectively. The angle between these lines is

   (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{3\pi}{4}$

3. The angle between the lines $\frac{x-2}{2}=\frac{y-1}{7}=\frac{z+3}{-3} \text{ and } \frac{x+2}{-1}=\frac{y-4}{2}=\frac{z-5}{4}$ is

   (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\cos^{-1}\left(\frac{3}{8}\right)$

4. If the lines $\frac{x-1}{-3}=\frac{y-2}{2k}=\frac{z-3}{2} \text{ and } \frac{x-1}{3k}=\frac{y-1}{1}=\frac{z-6}{-5}$ are perpendicular to each other then k = ?

   (a) $\frac{-5}{7}$ (b) $\frac{5}{7}$ (c) $\frac{10}{7}$ (d) $\frac{-10}{7}$

5. A line passes through the points A (2, -1, 4) and B (1, 2, -2). The equations of the line AB are

   (a) $\frac{x-2}{-1}=\frac{y+1}{2}=\frac{z-4}{-6}$ (b) $\frac{x+2}{-1}=\frac{y+1}{2}=\frac{z-4}{6}$

   (c) $\frac{x-2}{1}=\frac{y+1}{2}=\frac{z-4}{6}$ (d) none of these

6. The angle between the lines $\frac{x}{2}=\frac{y}{2}=\frac{z}{1} \text{ and } \frac{x-5}{4}=\frac{y-2}{1}=\frac{z-3}{8} \text{ is}$

   (a) $\cos^{-1}\left(\frac{3}{4}\right)$ (b) $\cos^{-1}\left(\frac{5}{6}\right)$ (c) $\cos^{-1}\left(\frac{2}{3}\right)$ (d) $\frac{\pi}{3}$

7. The angle between the lines $\vec{r} = (3\hat{i} + \hat{j} - 2\hat{k}) + \lambda(\hat{i} - \hat{j} - 2\hat{k})$ and $\vec{r} = (2\hat{i} - \hat{j} - 5\hat{k}) + \mu(3\hat{i} - 5\hat{j} - 4\hat{k})$

(a) $\cos^{-1}\left(\frac{8\sqrt{3}}{15}\right)$ (b) $\cos^{-1}\left(\frac{6\sqrt{2}}{5}\right)$ (c) $\cos^{-1}\left(\frac{5\sqrt{3}}{8}\right)$ (d) $\cos^{-1}\left(\frac{5\sqrt{2}}{6}\right)$

8. A line is perpendicular to two lines having direction ratios 1, -2, -2 and 0, 2, 1.

The direction cosines of the line are

(a) $\frac{-2}{3}, \frac{1}{3}, \frac{2}{3}$ (b) $\frac{2}{3}, \frac{1}{3}, \frac{-1}{3}$ (c) $\frac{2}{3}, \frac{-1}{3}, \frac{2}{3}$ (d) none of these

9. A line passes through the point A (5, -2, 4) and it is parallel to the vector($2\hat{i} - \hat{j} + 3\hat{k}$).

The vector equation of the line is

(a) $\vec{r} = (2\hat{i} - \hat{j} + 3\hat{k}) + \lambda(5\hat{i} - 2\hat{j} + 4\hat{k})$ (b) $\vec{r} = (5\hat{i} - 2\hat{j} + 4\hat{k}) + \lambda(2\hat{i} - \hat{j} + 3\hat{k})$

(c) $\vec{r} \cdot (5\hat{i} - 2\hat{j} + 4\hat{k}) = \sqrt{14}$ (d) none of these

10. The Cartesian equations of a line are $\frac{x-1}{2} = \frac{y+2}{3} = \frac{z-5}{-1}$. Its vector equation is

(a) $\vec{r} = (-\hat{i} + 2\hat{j} - 5\hat{k}) + \lambda(2\hat{i} + 3\hat{j} - \hat{k})$ (b) $\vec{r} = (2\hat{i} + 3\hat{j} - \hat{k}) + \lambda(\hat{i} - 2\hat{j} + 5\hat{k})$

(c) $\vec{r} = (\hat{i} - 2\hat{j} + 5\hat{k}) + \lambda(2\hat{i} + 3\hat{j} - 4\hat{k})$ (d) none of these

11. A line passes through the point A (-2, 4, -5) and is parallel to the line $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$. The vector equation of the line is

(a) $\vec{r} = (-3\hat{i} + 4\hat{j} - 8\hat{k}) + \lambda(-2\hat{i} + 4\hat{j} - 5\hat{k})$ (b) $\vec{r} = (-2\hat{i} + 4\hat{j} - 5\hat{k}) + \lambda(3\hat{i} + 5\hat{j} + 6\hat{k})$

(c) $\vec{r} = (3\hat{i} + 5\hat{j} + 6\hat{k}) + \lambda(-2\hat{i} + 4\hat{j} - 5\hat{k})$ (d) none of these

12. The coordinates of the point where the line through the points A (5, 1, 6) and

B (3, 4, 1) crosses the yz -plane is

(a) (0, 17, -13) (b) $\left(0, \frac{-17}{2}, \frac{13}{2}\right)$ (c) $\left(0, \frac{17}{2}, \frac{-13}{2}\right)$ (d) none of these

13. The vector equation of the x-axis is given by

(a) $\vec{r} = \hat{i}$ (b) $\vec{r} = \hat{j} + \hat{k}$ (c) $\vec{r} = \lambda \hat{i}$ (d) none of these

14. The Cartesian equations of a line are $\frac{x-2}{2} = \frac{y+1}{3} = \frac{z-3}{-2}$.What is its vector equation?

(a) $\vec{r} = (2\hat{i} + 3\hat{j} - 2\hat{k}) + \lambda(2\hat{i} - \hat{j} + 3\hat{k})$ (b) $\vec{r} = (2\hat{i} - \hat{j} + 3\hat{k}) + \lambda(2\hat{i} + 3\hat{j} - 2\hat{k})$

(c) $\vec{r} = (2\hat{i} + 3\hat{j} - 2\hat{k})$ (d) none of these

15. The angle between two lines having direction ratios 1, 1, 2 and $(\sqrt{3}-1), (-\sqrt{-3}-1), 4 is$

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{4}$

16. The straight line $\frac{x-2}{3} = \frac{y-3}{1} = \frac{z+1}{0} is$

(a) parallel to the x-axis (b) parallel to the y-axis (c) parallel to the z-axis

(d) perpendicular to the z-axis

17. If a line makes angles α, β and y with the x-axis, y-axis and z-axis

Respectively then $(\sin^2 \alpha + \sin^2 + \beta + \sin^2 y) = ?$

(a) 1 (b) 3 (c) 2 (d) $\frac{3}{2}$

18. If $(a_{1,} b_{1,} c_1) and (a_{2,} b_{2,}, c_2)$ be the direction ratios of two parallel lines then

(a) $a_1 = a_{2,} b_1 = b_{2,} c_1 = c_2$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(c) $a_1^2 + b_1^2 + c_1^2 = a_2^2 + b_2^2 + c_2^2$ (d) $a_1 a_2 + b_1 b_2 + c_1 c_2 = 0$

19. If the points $A(-1,3,2), B(-4,2,-2) and C(5,5,\lambda)$ are collinear then the value of λ is

(a) 5 (b) 7 (c) 8 (d) 10

ANSWERS : 3 D-I

1. (c)	2. (b)	3. (c)	4. (d)	5. (a)	6. (c)	7. (a)	8. (c)
9. (b)	10. (c)	11. (b)	12. (c)	13. (c)	14. (b)	15. (c)	16. (d)
17.(c)	18. (b)	19. (d)					

3D-2

1. The direction cosines of the perpendicular from the origin to the plane $\vec{r}.(6\hat{i}-3\hat{j}+2\hat{k})+1=0 are$

   (a) $\frac{6}{7},\frac{3}{7},\frac{-2}{7}$ (b) $\frac{6}{7},\frac{-3}{7},\frac{2}{7}$ (c) $\frac{-6}{7},\frac{3}{7},\frac{2}{7}$ (d) none of these

2. The direction cosines of the normal to the plane 5y + 4 =0 are

   (a) $0,\frac{-4}{5},0$ (b) 0, 1, 0 (c) 0, -1, 0 (d) none of these

3. The length of perpendicular from the origin to the plane $\vec{r}.(3\hat{i}-4\ \hat{j}-12\hat{k})+39=0 is$

   (a) 3units (b) $\frac{13}{5} units$ (c) $\frac{5}{3} units$ (d) none of these

4. The equation of a plane passing through the point A(2, -3, 7) and making equal Intercepts on the axes, is

   (a) x + y + z =3 (b) x + y + z = 6 (c) x + y + z = 9 (d) x + y + z=4

5. A plane cuts off intercepts 3, -4, 6 on the coordinate axes. The length of Perpendicular from the origin to this plane is

   (a) $\frac{5}{\sqrt{29}} units$ (b) $\frac{8}{\sqrt{29}} units$ (c) $\frac{6}{\sqrt{29}} units$ (d) $\frac{12}{\sqrt{29}} units$

6. If the line $\frac{x+1}{3}=\frac{y-2}{4}=\frac{z+6}{5}$ *is* parallel to the plane 2x -3y + kz = 0, then the value of k is

(a) $\frac{5}{6}$ (b) $\frac{6}{5}$ (c) $\frac{3}{4}$ (d) $\frac{4}{5}$

7. If O is the origin and P (1, 2, -3) is a given point, then the equation of the plane through P and perpendicular to OP is

(a) $x+2y-3z=14$ (b) $x-2y+3z=12$ (c) $x-2y-3z=14$ (d) none of these

8. If the line $\frac{x-4}{1}=\frac{y-2}{1}=\frac{z-k}{2}$ lies in the plane $2x-4y+z=7,$ then the value of k is

(a) -7 (b) 7 (c) 4 (d) -4

9. The plane $2x+3y+4c=12$ meets the coordinate axes in A, B and C. The centroid of ΔABC is

(a) (2, 3, 4) (b) (6, 4, 3) (c) $\left(2,\frac{4}{3},1\right)$ (d) none of these

10. If a plane meets the coordinate axes in A, B and C such that the centroid of ΔABC is (1, 2, 4), Then the equation of the plane is

(a) $x+2y+4z=6$ (b) $4x+2y+z=12$ (c) $x+2y+4z=7$

(d) $4x+2y+z=7$

11. The equation of a plane through the point A$(1,0,-1)$ and perpendicular to the line $\frac{x+1}{2}=\frac{y+3}{4}=\frac{z+7}{-3}$ is

(a) $2x+4y-3z=3$ (b) $2x-4y+3z=5$ (c) $2x+4y-3z=5$

(d) $x+3y+7z=-6$

12. The line $\frac{x-1}{2}=\frac{y-2}{4}=\frac{z-3}{4}$ meets the plane $2x+3y-z=14$ in the point

(a) (2, 5, 7) (b) (3, 5, 7) (c) (5, 7, 3) (d) (6, 5, 3)

13. The equation of the plane passing through the points A(2, 2, 1) and B(9, 3, 6) and Perpendicular to the plane $2x+6y+6z=1,$ is

(a) $x+2y-3z+5=0$ (b) $2x-3y+4z-6=0$ (c) $4x+5y-6z+3=0$

(d) $3x+4y-5z-9=0$

14. The equation of the plane passing through the intersection of the planes $3x-y+2z-4=0$ and $x+y+z-2=0$ and passing through the point A(2, 2, 1) is given by

(a) $7x+5y-4z-8=0$ (b) $7x-5y+4x-8=0$ (c) $5x+7y-4z+8=0$

(d) $5x+7y-4z+8=0$

15. The equation of the plane passing through the points A(0, -1, 0), B(2, 1, -1) and C(1, 1, 1) is given by

(a) $4x+3y-2x-3=0$ (b) $4x-3y+2x+3=0$ (c) $4x-3y+2x-3=0$

(d) none of these

16. If the plane $2x-y+z=0$ is parallel to the line $\frac{2x-1}{2}=\frac{2-y}{2}=\frac{z+1}{a}$, then

The value of a is

(a) -4 (b) -2 (c) 4 (d) 2

17. The angle between the $line \frac{x+1}{1}=\frac{y}{2}=\frac{z-1}{1}$ and a normal to the plane $x-y+z=0 is$

(a) 0° (b) 30° (c) 45° (d) 90°

18. The point of intersection of the line $\frac{x-1}{3}=\frac{y+2}{4}=\frac{z-3}{-2}$ and the plane $2x-y+3z-1=0$, is

(a) $(-10,10,3)$ (b) $(10,10,-3)$ (c) $(10,-10,3)$ (d) $(10,-10,-3)$

19. The equation of a pane passing through the points A(a, 0, 0), B(0, b, 0)and C(0, 0, c) is given by

(a) $ax+by+cz=0$ (b) $ax+by+cz=1$ (c) $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=0$ (d) $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$

20. If θ is the angle between the planes $2x-y+2x=3 and 6x-2y+3z=5$. then $\cos\theta=?$

(a) $\frac{11}{20}$ (b) $\frac{12}{23}$ (c) $\frac{17}{25}$ (d) $\frac{20}{21}$

21. The angle between the planes $2x - y + z = 6 and x + y + 2z = 7,$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

22. The angle between the planes $\vec{r}.(3\hat{i} - 6\hat{j} + 2\hat{k}) = 4 and \vec{r}.(2\hat{i} - \hat{j} + 2\hat{k}) = 3,$ is

(a) $\cos^{-1}\left(\frac{16}{21}\right)$ (b) $\cos^{-1}\left(\frac{4}{21}\right)$ (c) $\cos^{-1}\left(\frac{3}{4}\right)$ (d) $\cos^{-}\left(\frac{1}{4}\right)$

23. The equation of the plane through the points A(2, 3, 1) and B(4, -5, 3), Parallel to the x-axis, is

(a) x + y – 3x = 2 (b) y + 4z =7 (c) y + 3z = 6 (d) x + 5y – 3z = 4

24. A variable plane moves so that the sum of the reciprocals of its intercepts on the Coordinate axes is (1/2), Then, the plane passes through the point

(a) (0, 0, 0) (b) (1, 1, 1) (c) $\left(\frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right)$ (d) (2, 2, 2)

25. The equation of a plane which is perpendicular to $(2\hat{i} - 3\hat{j} + \hat{k})$ and at a distance of 5units from the origin is

(a) $2x - 3y + z = 5$ (b) $2x - 3y + z = 5\sqrt{14}$ (c) $\frac{x}{2} - \frac{y}{3} + \frac{z}{1} = 5$

(d) $\frac{x}{2} - \frac{y}{3} + \frac{z}{1} = \frac{5}{\sqrt{14}}$

26. The equation of the plane passing through the point A(2, 3, 4) and parallel to the plane $5x - 6y + 7z = 3,$ is

(a) $5x - 6y + 7z = 20$ (b) $7x - 6y + 5z = 72$ (c) $20x - 18y + 14z = 11$

(d) $10x - 18y + 28z = 13$

27. The foot of the perpendicular from the point A (7, 14, 5) and parallel to the plane 2x + 4y- z =2 is

(a) (3, 1, 8) (b) (1, 2, 8) (c) $(3, -3, 5)$ (d) $(5, -3, -4)$

28. The equation of the plane which makes with the coordinate axes, a triangle with Centroid (α, β, y) is given by

(a) $\alpha x + \beta y + \gamma^z = 1$ (b) $\alpha x + \beta y + \gamma^z = 3$ (c) $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 1$ (d) $\frac{x}{\alpha} + \frac{y}{\beta} + \frac{z}{\gamma} = 3$

29. The intercepts made by the plane $\vec{r}.(2\hat{i} - 3\hat{j} + 4\hat{k}) = 12$ are

(a) $2,-3,4$ (b) $2,-3,-6$ (c) $-6,-4,3$ (d) $-6,4,3$

30. The angle between the line $\frac{x-2}{1} = \frac{y+3}{-2} = \frac{z+4}{-3}$ and the plane $2x - 3y + z = 5$ is

(a) $\cos^{-1}\left(\frac{5}{14}\right)$ (b) $\sin^{-1}\left(\frac{5}{14}\right)$ (c) $\cos^{-1}\left(\frac{3}{7}\right)$ (d) $\sin^{-1}\left(\frac{3}{7}\right)$

31. The angle between the line $\vec{r}.(\hat{i} + \hat{j} - 3\hat{k}) + \lambda(2\hat{i} + 2\hat{j} + \hat{k})$ and the plane

$\vec{r}.(6\hat{i} - 3\hat{j} + 2\hat{k}) = 5,$ is

(a) $\cos^{-1}\left(\frac{8}{21}\right)$ (b) $\cos^{-1}\left(\frac{5}{21}\right)$ (c) $\sin^{-1}\left(\frac{5}{21}\right)$ (d) $\sin^{-1}\left(\frac{8}{21}\right)$

32. The distance of the point $(\hat{i} + 2\hat{j} + 5\hat{k})$ from the plane $\vec{r}.(\hat{i} + \hat{j} + \hat{k}) + 17 = 0,$ is

(a) $\frac{25}{\sqrt{2}} units$ (b) $\frac{25}{\sqrt{3}}$ units (c) $25\sqrt{2} units$ (d) $25\sqrt{3} units$

33. The distance between the parallel planes $2x - 3y + 6z = 5 and 6x - 9y + 18z + 20 = 0,$ is

(a) $\frac{5}{3} units$ (b) $5\sqrt{3} units$ (c) $\frac{8}{5} units$ (d) $8\sqrt{5} units$

34. The distance between the planes $x + 2y - 2z + 1 = 0 and 2x + 4y - 4z + 5 = 0$ is

(a) 4units (b) 2units (c) $\frac{1}{2} units$ (d) $\frac{1}{4} units$

35. The image of the point P(1, 3, 4) in the plane $2x - y + z + 3 = 0,$ is

(a) $(3,-5,2)$ (b) $(3,5,-2)$ (c) (3, 5, 2) (d) $(-3,5,2)$

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1. (c)	2. (c)	3. (a)	4. (b)	5. (d)	6. (b)	7. (a)	8. (b)	9. (c)
10. (b)	11. (c)	12. (b)	13. (d)	14.(b)	15. (c)	16. (a)	17. (d)	18. (b)
19. (d)	20. (d)	21. (c)	22. (a)	23. (b)	24. (d)	25. (b)	26.(a)	27. (b)
28. (d)	29.(c)	30. (b)	31. (d)	32. (b)	33. (a)	34. (c)	35. (d)	

PROBABILITY

1. If A and B are mutually exclusive events such that P(A) = 0.4 P(B) = x and P(AUB) 0.5 then x=?

   (a) 0. 2 (b) 0. 1 (c) $\frac{4}{5}$ (d) none of these

2. If A and B are independent events such that P(A) = 0.6 P(B) = x and P(AUB) 0.8 then x=?

   (a) $\frac{4}{5}$ (b) 0. 5 (c) $\frac{1}{6}$ (d) none of these

3. If $P(A)=0.8, P(B)=0.5 and P(B/A)=0.4, then P(A/B)=?$

   (a) 0.32 (b) 0.64 (c) 0.16 (d) 0.25

4. If $P(A)=\frac{6}{11}, P(B)=\frac{5}{11} and P(A\cup B)=\frac{7}{11}, then P(A/B)=?$

   (a) $\frac{5}{6}$ (b) $\frac{5}{7}$ (c) $\frac{6}{7}$ (d) $\frac{4}{5}$

5. If A and B are events such that $p(A)=\frac{1}{2}, p(B)=\frac{7}{12} and P(A^{'}\cup B^{'})=\frac{1}{4}$,then A and B are

   (a) independent (b) mutually exclusive (c) both 'a' and 'b' (d) none of these

6. It is given that the probability that A can solve a given problem is $\frac{3}{5}$ and the probability that B can solve the same problem is $\frac{2}{3}$. The probability that at least one of A and B can solve a problem is