3- Dimensional Coordinate Geometry 1

1. The angle between the planes, $3x - 4y + 5z = 0$ & $2x - y - 2z = 5$, is

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$

(C) $\frac{\pi}{6}$ (D) None of these

2. If α, β, γ be the angles which a line makes with the co-ordinate axes, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

(A) 2 (B) 1

(C) 3 (D) None of these

3. The point at which the line joining the points (2, - 3, 1) & (3, - 4, - 5) intersects the plane, $2x + y + z = 7$ is

(A) (1, 2, 7) (B) (1, - 2, 7)

(C) (- 1, 2, 7) (D) (1, - 2, - 7)

4. All the points on the x - axis have :

(A) $x = 0$ (B) $y = 0$

(C) $x = 0, y = 0$ (D) $y = 0, x = 0$

5. Distance between the points (1, 3, 2) and (2, 1, 3) is :

(A) 12 (B) $\sqrt{12}$

(C) $\sqrt{6}$ (D) 6

6. The direction cosines of the line, $x = y = z$ are :

(A) $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (B) $\frac{1}{3}, \frac{1}{3}, \frac{1}{3}$

(C) $\sqrt{5}, \sqrt{13}, \sqrt{10}$

(D) $\frac{1}{\sqrt{13}}, \frac{1}{\sqrt{10}}, \frac{1}{\sqrt{5}}$

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

(A) (0, 1, - 2) (B) (1, 2, 3)

(C) $\left(\frac{-1}{11}, \frac{9}{11}, \frac{-25}{11}\right)$ (D)

8. Which of the following set of points arre non-collinear ?

(A) (1, - 1, 1), (- 1, 1, 1), (0, 0, 1)

(B) (1, 2, 3), (3, 2, 1), (2, 2, 2)

(C) $(-2,4,-3), (4,-3,-2), (-3,-2,4)$

(D) (2, 0, – 1), (3, 2, – 2), (5, 6, – 4)

9. If a straight line in space is equally inclined to the co-ordinate axes, the cosine of the angle of inclination to any one of the axes is :

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$

(C) $\frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{2}}$

10. The equation of the st. line passing through (1, 2, 3) and perpendicular to the plane $x + 2y - 5z = 0$ 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) $\frac{x+1}{1} = \frac{y+2}{2} = \frac{z-5}{3}$

11. Equation, $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy + 2ux + 2vy + 2wz + d = 0$ represents a sphere, if :

(A) $a = b = c$ (B) $f = g = h = 0$

(C) $v = u = w$

(D) $a = b = c$ & $f = g = h = 0$

12. If, $\frac{x-1}{\ell} = \frac{y-2}{m} = \frac{z+1}{n}$ is the equation of the line through (1, 2, - 1) and (- 1, 0, 1), then (l, m, n) is :
(A) (- 1, 0, 1) (B) (1, 1, - 1)
(C) (1, 2, - 1) (D) (0, 1, 0)

13. A point moves so that the sum of its distances from the points (4, 0, 0) and (- 4, 0, 0) remains 10 . The locus of the point is :
(A) $9x^2 - 25y^2 + 25z^2 = 225$
(B) $9x^2 + 25y^2 - 25z^2 = 225$
(C) $9x^2 + 25y^2 + 25z^2 = 225$
(D) $9x^2 + 25y^2 + 25z^2 + 225 = 0$

14. The value of k for which the planes $3x - 6y - 2z = 7$ and $2x + y - kz = 5$ are perpendicular to each other is :
(A) 0 (B) 1
(C) 2 (D) 3

15. $x + y + z + 2 = 0$ together with $x + y + z + 3 = 0$ represents in space
(A) A line (B) A point
(C) A plane (D) None of these

16. The distance between the planes, $x + 2y + 3z + 7 = 0$ & $2x + 4y + 6z + 7 = 0$ is :
(A) (B) $\frac{7}{2}$
(C) $\frac{\sqrt{7}}{2}$ (D) $\frac{7}{2\sqrt{2}}$

17. The equation of the plane through (1, 2, 3) and parallel to the plane $2x + 3y - 4z$ is :
(A) $2x + 3y + 4z = 4$
(B) $2x + 3y + 4z + 4 = 0$
(C) $2x - 3y + 4z + 4 = 0$
(D) $2x + 3y - 4z + 4 = 0$

18. Distance of the point (2, 3, 4) from the plane, $3x - 6y + 2z + 11 = 0$ is
(A) 1 (B) 2
(C) 3 (D) 0

19. The point of intersection of lines,
$\frac{x-4}{5} = \frac{y-1}{2} = \frac{z}{1}$ & $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$
is :
(A) $(-1, -1, -1)$ (B) $(-1, -1, 1)$
(C) $(1, -1, -1)$ (D) $(-1, 1, -1)$

20. If $4x + 4y + kz = 0$ is the equation of the plane through the origin that contains the line, $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z}{4}$, then k =
(A) 1 (B) 3
(C) 5 (D) 7

21. xy - plane divides the line joining the points (2, 4, 5) and (- 4, 3, - 2) in the ratio :
$\frac{\sqrt{7}}{2\sqrt{2}}$
(A) 3 : 5 (B) 5 : 2
(C) 1 : 3 (D) 3 : 4

22. If A (1, 2, - 1) and B (- 1, 0, 1) are given, then the co-ordinates of P which divides AB externally in the ratio 1 : 2, are :
(A) $\frac{1}{3}$ (1, 4, - 1) (B) (3, 4, - 3)
(C) $\frac{1}{3}$ (3, 4, - 3) (D) None of these

23. The equation of yz - plane is :
(A) $x = 0$ (B) $y = 0$
(C) $z = 0$ (D) $x + y + z = 0$

24. Points (- 2, 4, 7), (3, - 6, - 8) and (1, - 2, - 2) are :

(A) Collinear
(B) Vertices of an equilateral triangle
(C) Vertices of an isosceles triangle
(D) None of these

25. The angle between the planes, $2x - y + z = 0$ and $x + y + 2z = 7$ is
(A) 150° (B) 270°
(C) 330° (D) 60°

26. The direction ratios of the line joining the points (4, 3, – 5) & (- 2, 1, – 8) are
(A) $\frac{6}{7}, \frac{2}{7}, \frac{3}{7}$ (B) 6, 2, 3
(C) 2, 4, – 13 (D) None of these

27. The projection of any line on co-ordinate axes be respectively 3, 4, 5 then its length is :
(A) 12 (B) 50
(C) $5\sqrt{2}$ (D) None of these

28. The co-ordinates of a point which is equidistant from the points (0, 0, 0), (a, 0, 0), (0, b, 0) & (0, 0, c) are given by :
(A) $\left(\frac{a}{2}, \frac{b}{2}, \frac{c}{2}\right)$ (B) $\left(-\frac{a}{2}, -\frac{b}{2}, \frac{c}{2}\right)$
(C) $\left(\frac{a}{2}, -\frac{b}{2}, -\frac{c}{2}\right)$ (D) $\left(-\frac{a}{2}, \frac{b}{2}, -\frac{c}{2}\right)$

29. The angle between the lines whose direction cosines satisfy the equations $l + m + n = 0$, $l^2 + m^2 - n^2 = 0$ is given by
(A) $\frac{2\pi}{3}$ (B) $\frac{\pi}{6}$
(C) $\frac{5\pi}{6}$ (D) $\frac{\pi}{3}$

30. The equation of a plane which passes through (2, – 3, 1) & is normal to the line joining the points (3, 4, - 1) & (2, - 1, 5) is given by :
(A) x + 5y - 6z + 19 = 0
(B) x - 5y + 6z - 19 = 0
(C) x + 5y + 6z + 19 = 0
(D) x - 5y - 6z - 10 = 0

31. The line, $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ is parallel to the plane :
(A) 3x + 4y + 5z = 7
(B) 2x + y - 2z = 0
(C) x + y - z = 2
(D) 2x + 3y + 4z = 0

32. The equation of the plane passing through the points (2, 2, 1) & (9, 3, 6) and perpendicular to the plane, $2x + 6y + 6z = 1$, is :
(A) 3x + 4y + 5z = 9
(B) 3x + 4y + 5z = 0
(C) 3x + 4y – 5z = 9
(D) None of these

33. The length & foot of the perpendicular from the point (7, 14, 5) to the plane, $2x + 4y - z = 2$, are :
(A) $\sqrt{21}, (1, 2, 8)$ (B) $3\sqrt{21}, (3, 2, 8)$
(C) $21\sqrt{3}, (1, 2, 8)$
(D) $3\sqrt{21}, (1, 2, 8)$

34. The equation of the plane passing through the intersection of the planes x + y + z = 6 & 2x + 3y + 4z + 5 = 0 and the point (1, 1, 1), is :
(A) 20x + 23y + 26z - 69 = 0
(B) 20x + 23y + 26z + 69 = 0
(C) 23x + 20y + 26z + 69 = 0
(D) None of these

35. The equation of hte plane which contains the line of intersection of the planes $x+2y+3z-4=0$ & $2x+y-z+5=0$ and which is perpendicular to the plane, $5x + 3y - 6z + 8 = 0$, is :
(A) $33x + 50y + 45z - 41 = 0$
(B) $33x + 45y + 50z + 41 = 0$
(C) $45x + 45y + 50z - 41 = 0$
(D) $33x + 45y + 50z - 41 = 0$

36. The equation of the plane through the three points (1, 1, 1), (1, – 1, 1) and (- 7, - 3, - 5), is :
(A) $3x-4z+1=0$ (B) $3x-4y+1=0$
(C) $3x+4y+1=0$ (D) None of these

37. The equation of the plane which is parallel to the line,

$\frac{x-4}{1}=\frac{y+3}{-4}=\frac{z+1}{7}$ & passes through the point (0, 0, 0) & (3, - 1, 2), is :
(A) $x + 19y + 11z = 0$
(B) $x - 19y - 11z = 0$
(C) $x - 19y + 11z = 0$
(D) None of these

38. The ratio in which the plane, $x-2y+3z=17$ divides the line joining the points (- 2, 4, 7) & (3, - 5, 8) is
(A) $2x - 4y + 3z - 8 = 0$
(B) $2x - 4y - 3z + 8 = 0$
(C) $2x + 4y + 3z + 8 = 0$
(D) None of these

39. The point where the line,

$\frac{x-1}{2}=\frac{y-2}{-3}=\frac{z+3}{4}$ meets the plane $2x + 4y - z = 1$, is :
(A) (3, - 1, 1) (B) (3, 1, 1)
(C) (1, 1, 3) (D) (1, 3, 1)

40. The length and foot of the perpendicular from the point (2,– 1,5) to the line, $\frac{x-11}{10}=\frac{y+2}{-4}=\frac{z+8}{-11}$ are

(A) $\sqrt{14}\,,(1,2,-3)$ (B) $\sqrt{14}\,,(1,-2,3)$
(C) $\sqrt{14}\,,(1,2,3)$ (D) None of these

41. The distance of the point, (– 1, – 5, – 10) from the point of intersection of the line,

$\frac{x-2}{3}=\frac{y+1}{4}=\frac{z-2}{12}$ and the plane, $x - y + z = 5$, is :
(A) 10 (B) 11
(C) 12 (D) 13

42. The equation of the line passing through (1, 2, 3) and parallel to the planes, $x-y+2z=0$ & $3x+y+z=6$, is

(A) $\frac{x-1}{-3}=\frac{y-2}{5}=\frac{z-3}{4}$

(B) $\frac{x-1}{-3}=\frac{y-2}{-5}=\frac{z-1}{4}$

(C) $\frac{x-1}{-3}=\frac{y-2}{-5}=\frac{z-1}{-4}$

(D) None of these

43. The projection of the line segment joining the points (– 1, 0, 3) & (2, 5, 1) on the line whose direction ratios are 6, 2, 3, is :

(A) $\frac{10}{7}$ (B) $\frac{22}{7}$

(C) $\frac{18}{7}$ (D) None of these

44. The equations of the line passing through the point (1, 2, - 4) and perpendicular to the two lines,

$\frac{x-8}{1} = \frac{y+19}{-16} = \frac{z-10}{7}$ and

$\frac{x-15}{3} = \frac{y+29}{8} = \frac{z-5}{-5}$ will be :

(A) $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+4}{6}$

(B) $\frac{x-1}{-2} = \frac{y-2}{3} = \frac{z+4}{8}$

(C) $\frac{x-1}{3} = \frac{y-2}{2} = \frac{z+4}{8}$

(D) None of these

45. The distance of the point (1, - 2, 3) from the plane $x - y + z = 5$ measured parallel to the line, $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$, is :

(A) 1 (B) $\frac{6}{7}$

(C) $\frac{7}{6}$ (D) None of these

46. The angle between the line,

$\frac{x+1}{3} = \frac{y-1}{2} = \frac{z-2}{4}$ and the plane,

$2x + y - 3z + 4 = 0$, is :

(A) $\sin^{-1}\left(\frac{4}{\sqrt{406}}\right)$ (B) $\sin^{-1}\left(\frac{-4}{\sqrt{406}}\right)$

(C) $\sin^{-1}\left(\frac{4}{14\sqrt{29}}\right)$ (D) None of these

47. The lines, $x = ay + b$, $z = cy + d$ and $x = a'y + b'$, $z = c'y + d'$ are perpendicular to each other, if :

(A) $aa' + cc' = 1$ (B) $aa' + cc' = -1$

(C) $ac + a'c' = 1$ (D) $ac + a'c' = -1$

48. The equation of straight line passing through the points (a, b, c) and (a - b, b - c, c - a) is :

(A) $\frac{x-a}{a-b} = \frac{y-b}{b-c} = \frac{z-c}{c-a}$

(B) $\frac{x-a}{b} = \frac{y-b}{c} = \frac{z-c}{a}$

(C)

(D)

49. Distance between parallel planes, $2x - 2y + z + 3 = 0$ and $4x - 4y + 2z + 5 = 0$, is :

$\frac{x-a}{2a-b} = \frac{y-b}{2b-c} = \frac{z-c}{2c-a}$

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$

(C) $\frac{1}{6}$ (D) 2

50. The number of st. lines that are equally inclined to the three dimensional co-ordinate axes, is :

(A) 2 (B) 4

(C) 6 (D) 8

51. If the given planes, $ax + by + cz + d = 0$ and $a'x + b'y + c'z + d' = 0$ be mutually perpendicular, then :

(A) $\frac{a}{a'} = \frac{b}{b'} = \frac{c}{c'}$

(B) $\frac{a}{a'} + \frac{b}{b'} + \frac{c}{c'} = 0$

(C) $aa' + bb' + cc' + dd' = 0$
(D) $aa' + bb' + cc' = 0$

52. The angle between the lines, $2x = 3y = -z$ & $6x = -y = -4z$, is :
(A) 0º (B) 30º
(C) 45º (D) 90º

53. A line makes the angle α, β, γ with three dimensional co-ordinate axes respectively, then, $\cos 2\alpha + \cos 2\beta + \cos 2\gamma =$
(A) - 2 (B) - 1
(C) 1 (D) 2

54. Perpendicular distance of the point (3, 4, 5) from the y-axis, is :
(A) $\sqrt{34}$ (B) $\sqrt{41}$
(C) 4 (D) 5

55. The ratio in which the line joining the points (a, b, c) & (– a, – c, – b) is divided by the xy-plane, is :
(A) a : b (B) b : c
(C) c : a (D) c : b

56. A tetrahedron has vertices at O (0, 0, 0), A (1, 2, 1), B (2, 1, 3) and C (- 1, 1, 2) . Then the angle between the faces OAB and ABC will be :
(A) $\cos^{-1}\left(\frac{19}{35}\right)$ (B) $\cos^{-1}\left(\frac{17}{31}\right)$
(C) 30º (D) 90º

57. The equation of straight line passing through the point (a, b, c) and parallel to z - axis, is :
(A) $\frac{x-a}{1} = \frac{y-b}{1} = \frac{z-c}{0}$
(B) $\frac{x-a}{0} = \frac{y-b}{1} = \frac{z-c}{1}$
(C) $\frac{x-a}{1} = \frac{y-b}{0} = \frac{z-c}{0}$
(D) $\frac{x-a}{0} = \frac{y-b}{0} = \frac{z-c}{1}$

58. If line $\frac{x-x_1}{\ell} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$ is parallel to the plane, $ax + by + cz + d = 0$, then :
(A) $\frac{a}{\ell} = \frac{b}{m} = \frac{c}{n}$
(B) $a\ell + bm + cn = 0$
(C) $\frac{a}{\ell} + \frac{b}{m} + \frac{c}{n} = 0$
(D) None of these

59. If θ is the angle between the lines AB and CD, then projection of line segment AB on line CD, is :
(A) AB sin θ (B) AB cos θ
(C) AB tan θ (D) CD cos θ

60. If the planes, $3x - 2y + 2z + 17 = 0$ & $4x + 3y - kz = 25$ are mutually prependicular, then k =
(A) 3 (B) - 3
(C) 9 (D) - 6

61. If the direction cosines of a line are $\left(\frac{1}{c}, \frac{1}{c}, \frac{1}{c}\right)$, then :
(A) $c > 0$ (B) $c = \pm\sqrt{3}$
(C) $0 < c < 1$ (D) $c > 2$

62. The plane XOZ divides the join of (1, - 1, 5) & (2, 3, 4) in the ratio $\lambda : 1$, then λ is :
(A) - 3 (B) 3
(C) - 1/3 (D) 1/3

63. The equation of the plane which bisects the line joining (2, 3, 4) and (6, 7, 8) is :
(A) $x + y + z - 15 = 0$
(B) $x - y + z - 15 = 0$
(C) $x - y - z - 15 = 0$
(D) $x + y + z + 15 = 0$

64. The plane $ax + by + cz = 1$ meets the co-ordinate axes in A, B and C . The centroid of the triangle is :

(A) (3a, 3b, 3c) (B) $\left(\frac{a}{3}, \frac{b}{3}, \frac{c}{3}\right)$

(C) $\left(\frac{3}{a}, \frac{3}{b}, \frac{3}{c}\right)$ (D) $\left(\frac{1}{3a}, \frac{1}{3b}, \frac{1}{3c}\right)$

65. The perpendicular distance of the point (2, 4, - 1) from the line,

$\frac{x+5}{1} = \frac{y+3}{4} = \frac{x-6}{-9}$ is :

(A) 3 (B) 5
(C) 7 (D) 9

66. The co-ordinates of a point P are (3, 12, 4) with respect to origin O, then the direction cosines of OP are

(A) 3, 12, 4 (B) $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$

(C) $\frac{3}{\sqrt{13}}, \frac{1}{\sqrt{13}}, \frac{2}{\sqrt{13}}$ (D) $\frac{3}{13}, \frac{12}{13}, \frac{4}{13}$

67. The direction ratios of the diagonals of a cube which joins the origin to the opposite corner are (when the 3 concurrent edges of the cube are co-ordinate axes) :

(A) $\frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}$ (B) 1, 1, 1
(C) $2, -2, 1$ (D) 1, 2, 3

68. The cosine of the angle between any two diagonals of a cube is :

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$

(C) $\frac{2}{3}$ (D) $\frac{1}{\sqrt{3}}$

69. The equation of a plane which cuts equal intercepts of unit length on the axes, is :
(A) $x+y+z = 0$ (B) $x+y+z = 1$

(C) $x+y-z = 1$ (D) $\frac{x}{a}+\frac{y}{a}+\frac{z}{a} = 1$

70. The direction cosines of the normal to the plane, $x + 2y - 3z + 4 = 0$, are

(A) $-\frac{1}{\sqrt{14}}, -\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

(B) $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

(C) $-\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

(D) $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, -\frac{3}{\sqrt{14}}$

71. The equation of the plane through (2, 3, 4) and parallel to the plane, $x + 2y + 4z = 5$ is :
(A) $x + 2y + 4z = 10$
(B) $x + 2y + 4z = 3$
(C) $x + y + 2z = 2$
(D) $x + 2y + 4z = 24$

72. The angle between two lines,

$\frac{x+1}{2}=\frac{y+3}{2}=\frac{z-4}{-1}$ & $\frac{x-4}{1}=\frac{y+4}{2}=\frac{z+1}{2}$

is :

(A) $\cos^{-1}\left(\frac{1}{9}\right)$ (B) $\cos^{-1}\left(\frac{2}{9}\right)$

(C) $\cos^{-1}\left(\frac{3}{9}\right)$ (D) $\cos^{-1}\left(\frac{4}{9}\right)$

ANSWERS

1. B 2. A 3. B 4. D 5. C 6. A
7. D 8. C 9. C 10. A 11. D 12.B
13. C 14. A 15. D 16. A 17. D 18.A
19. A 20. C 21. B 22. B 23. A 24.A
25. D 26. B 27. C 28. A 29. D 30.A
31. B 32. C 33. D 34. A 35. D 36.A
37. B 38. C 39. A 40. C 41. D 42.A
43. B 44. A 45. A 46. B 47. B 48.B
49. C 50. B 51. D 52. D 53. B 54.A
55. D 56. A 57. D 58. B 59. B 60.A
61. B 62. D 63. A 64. D 65. C 66.D
67. AB68. A 69. B 70. AD71. D 72.D