Multiple Choice Questions. Unit II

1. A line which makes angles 45°, 60°, 60°with the positive direction of x-axis, y-axis, z-axis, respectively, then the direction cosines of the line are

   A. $\frac{1}{\sqrt{2}}, \frac{1}{2}, -\frac{1}{2}$

   B. $\frac{1}{2}, -\frac{1}{\sqrt{2}}, \frac{1}{2}$

   C. $\frac{1}{\sqrt{2}}, \frac{1}{2}, \frac{1}{2}$

   D. $-\frac{1}{2}, \frac{1}{2}, \frac{1}{\sqrt{2}}$

2. The direction cosines of the line which equally inclined to the positive direction of the axes are

   A. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}$

   B. $\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

   C. $-\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

   D. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

3. The direction cosines of the line joining the points (-2,1,-8) and (4,3,-5) are

   A. $\frac{6}{7}, \frac{2}{7}, \frac{3}{7}$

   B. $\frac{2}{7}, -\frac{3}{7}, \frac{1}{7}$

   C. $\frac{3}{7}, \frac{2}{7}, \frac{4}{7}$

   D. $\frac{1}{7}, -\frac{2}{7}, \frac{2}{7}$

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

A. $sin^{-1}(\frac{4}{5\sqrt{5}})$,

B. $sin^{-1}(\frac{\sqrt{2}}{10})$,

C. $sin^{-1}(\frac{1}{2\sqrt{5}})$,

D. $cos^{-1}(\frac{\sqrt{2}}{10})$,

5. The distance between the two planes $2x + 3y + 4z = 4$ and $4x + 6y + 8z = 12$ is

A. 4

B. 2

C. $\frac{2}{\sqrt{29}}$

D. 8

6. The equation of $yz-$plane is

A. $y = 0$

B. $z = 0$

C. $x = 0$

D. $y = 0, z = 0$

7. The equation of plane parallel to $xy-$plane is

A. $x = 1$

B. $y = 2$

C. $z = 3$

D. $x = y$

8. The equation of plane passing through the point $(1, -1, 2)$ and parallel to the plane $3x - 2y + 4z = 7$ is

A. $3x - 2y + 4z = -13$

B. $3x - 2y + 4z = 11$

C. $3x - 2y + 4z = -11$

D. $3x - 2y + 4z = 13$

9. The direction cosines of the plane $2x + 2y - z = 3$ are

A. $\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}$

B. $\frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

C. $\frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}$

D. $\frac{1}{3}, -\frac{2}{3}, \frac{2}{3}$

10. The equation of plane which makes the equal intercepts on the axes and passes through the point $(1, 2, 3)$ is

A. $x + y + z = 3\sqrt{3}$

B. $x + y + z = \sqrt{3}$

C. $x + y + z = 6$

D. $x + y + z = 3$

11. Which of the following plane is normal form of the plane $2x + 3y + 6z = 18$

A. $\frac{2x}{7} + \frac{3y}{7} + \frac{6z}{7} = \frac{18}{7}$

B. $\frac{6x}{7} + \frac{y}{7} + \frac{3z}{7} = \frac{18}{7}$

C. $\frac{2x}{7} + \frac{3y}{7} + \frac{z}{7} = \frac{6}{7}$

D. $\frac{x}{7} + \frac{3y}{7} + \frac{z}{7} = \frac{1}{7}$

12. Which of the following plane is intercept form of the plane $6x + 2y - 3z = 18$

A. $\frac{x}{3} + \frac{y}{9} + \frac{z}{-6} = 1$

B. $\frac{x}{6}+\frac{y}{2}+\frac{z}{-3}=1$

C. $\frac{x}{1}+\frac{y}{3}+\frac{z}{2}=1$

D. $\frac{x}{-6}+\frac{y}{3}+\frac{z}{6}=1$

13. The plane passing through the origin is

A. $2x-y+z=8$

B. $x+y+2z=3$

C. $x-2y+6z=0$

D. $x-2y+z=2$

14. The equation of the plane passing through the three points $(1,1,1),(1,-1,1)$ and $(-7,-3,-5)$ is

A. $3x-4z=-1$

B. $3x+y+z=1$

C. $x+y+2z=0$

D. None of these

15. For which value of a,the planes $2x-5y+z=-2$ and $x+y+az=1$ are perpendicular

A. 1

B. 3

C. -2

D. -3

16. For value of b, the planes $2x+3y-z=0$ and $-4x+by+2z=6$ are parallel

A. 5

B. -6

C. 3

D. 2

17. The equation of plane passing through the points $(2, 3, -4)$, $(1, -1, 3)$, and parallel to the $x - axis$ is

A. $7y + 4z = 5$

B. $x + y + 2z = 1$

C. $2x - 5y = 6$

D. None of these

18. The distance of the point $(1, 1, 1)$ from the line $\frac{x-2}{3} = \frac{y+3}{2} = \frac{z}{-1}$ is

A. 7

B. $\frac{6}{7}$

C. $\frac{826}{7}$

D. $\frac{\sqrt{826}}{7}$

19. The direction ratios of the line $2x - y - z = 2$, $x + 2y - 3z = 11$ are

A. $1, 2, 3$

B. $3, 1, 2$

C. $1, 1, 1$

D. $2, 2, 1$

20. The shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ is

A. $\frac{1}{\sqrt{6}}$

B. $\frac{1}{\sqrt{3}}$

C. $\frac{1}{6}$

D. None of these

21. The coordinates of foot of the perpendicular drawn from the point $(3, 2, 5)$ on the $x-$axis is

A. $(0, 2, 0)$

B. $(0, 0, 5)$

C. $(3, 0, 0)$

D. $(0, 2, 5)$

22. If α, β, γ are the angles that a line makes with the positive direction of x, y, z axes, respectively, then the direction cosines of the line are

A. $cos\alpha, cos\beta, cos\gamma$

B. $sin\alpha, sin\beta, sin\gamma$

C. $sin\alpha, cos\beta, sin\gamma$

D. $cos^2\alpha, cos^2\beta, cos^2\gamma$

23. The distance of the point $(1, 2, -3)$ to $x-$axis is

A. $\sqrt{5}$

B. 13

C. 5

D. $\sqrt{13}$

24. The equation of $y-$axis in (3-D) space is

A. $x = 0, y = 0$

B. $x = 0, z = 0$

C. $y = 0, z = 0$

D. $y = 0$

25. If the direction ratios of a line are $2, 1, 2$, then the direction cosines of the line will be

A. $\frac{2}{3}, \frac{1}{3}, \frac{2}{3}$

B. $\frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}$

C. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

D. $\frac{3}{7}, \frac{2}{7}, \frac{6}{7}$

26. If x co-ordinate of a point on the line joining the points $Q(2, 2, 1)$ and $R(5, 1, -2)$ is 4, then the y and z co-ordinates are

A. $y = \frac{4}{3}, z = -1$

B. $y = 4, z = 1$

C. $y = 3, z = 2$

D. $y = -1, z = 4$

27. The distance from position vector $2\hat{i} + \hat{j} - \hat{k}$ to the plane $\overrightarrow{\mathbf{r}}.(\hat{i} - 2\hat{j} + 4\hat{k}) = 9$ is

A. $\frac{13}{7}$

B. $\frac{13}{21}$

C. $\frac{13\sqrt{21}}{21}$

D. None of these

28. The equation of plane passing through the point (a_1, b_1, c_1) and perpendicular to the vector $a_2\hat{i} + b_2\hat{j} + c_2\hat{k}$ is

A. $x + y + z = a_1a_2 + b_1b_2 + c_1c_2$

B. $a_2x + b_2y + c_2z = a_1a_2$

C. $a_1x + b_1y + c_1z = a_1a_2 + b_1b_2 + c_1c_2$

D. None of these

29. The perpendicular distance from the origin to the plane $\overrightarrow{\mathbf{r}}.(a_1\hat{i} + b_1\hat{j} + c_1\hat{k}) = (a_1\hat{i} + b_1\hat{j} + c_1\hat{k}).(a_2\hat{i} + b_2\hat{j} + c_2\hat{k})$ is

A. $\frac{a_1a_2+b_1b_2+c_1c_2}{a_1+b_1+c_1}$

B. $\frac{a_1a_2+b_1b_2+c_1c_2}{a_1^2+b_1^2+c_1^2}$

C. $\frac{a_1a_2+b_1b_2+c_1c_2}{a_2+b_2+c_2}$

D. $\frac{a_1a_2+b_1b_2+c_1c_2}{\sqrt{a_1^2+b_1^2+c_1^2}}$

30. The angle between planes $\overrightarrow{\mathbf{r}}.(\hat{i}-6\hat{j}+2\hat{k}) = 3$ and $\overrightarrow{\mathbf{r}}.(4\hat{i}+\hat{j}+\hat{k}) = 2$ is

A. π

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

31. The equation of plane through point $(1, -2, 3)$ and parallel to plane $2x - 3y + z = 5$ is

A. $2x - 3y + z = 11$

B. $2x - 3y + z = 2$

C. $2x - 3y + z = -11$

D. $2x - 3y + z = 0$

32. If $cos\alpha, cos\beta, cos\gamma$ are the direction cosines of any line, then

A. $sin^2\alpha + cos^2\beta + cos^2\gamma = 1$

B. $sin^2\alpha + sin^2\beta + sin^2\gamma = 2$

C. $cos^2\alpha + cos^2\beta + cos^2\gamma = 2$

D. $sin^2\alpha + sin^2\beta + sin^2\gamma = 1$

33. The equation of the plane through the points $(2, 2, 1), (1, -2, 3)$ and parallel to the line joining the points $(2, 1, -3), (-1, 5, 8)$ is

A. $12x - 11y - 16z = -14$

B. $12x + 11y - 16z = 11$

C. $12x + 11y + 6z = 24$

D. None of these

34. The distance between parallel planes $3x+2y+z = 5$ and $3x+2y+z = 10$ is

A. $\frac{7}{\sqrt{14}}$

B. $\frac{5}{\sqrt{14}}$

C. $\frac{1}{14}$

D. $\frac{2}{14}$

35. The distance between the planes $x-2y+3z = 1$ and $3x-6y+9z = 7$

A. $\frac{4}{\sqrt{126}}$

B. $\frac{1}{\sqrt{26}}$

C. $\frac{1}{\sqrt{126}}$

D. $\frac{7}{\sqrt{126}}$

36. The equation of straight line passing through the point $(2, 3, 4)$ and parallel to $x-$axis is

A. $x - 2 = 0, z - 4 = 0$

B. $y - 3 = 0, z - 4 = 0$

C. $x+2=0, z-4=0$

D. $x-2=0, y+3=0$

37. The equation of straight line passing through two points $(2,-1,3)$ and $(3,1,2)$ is

A. $\frac{x+2}{1}=\frac{y-1}{2}=\frac{z-3}{3}$

B. $\frac{x-2}{1}=\frac{y-1}{2}=\frac{z-3}{1}$

C. $\frac{x-2}{1}=\frac{y+1}{2}=\frac{z-3}{-1}$

D. $\frac{x+2}{1}=\frac{y-1}{2}=\frac{z+3}{1}$

38. The angle between two straight line $\frac{x-1}{1}=\frac{y}{3}=\frac{z+1}{1}$ and $\frac{x}{1}=\frac{y}{-1}=\frac{z}{2}$ is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{2}$

C. π

D. $\frac{\pi}{6}$

39. The equation of straight line passing through the vector $\overrightarrow{\mathbf{a}}$ and parallel to vector $\overrightarrow{\mathbf{b}}$ is

A. $\overrightarrow{\mathbf{r}}=\overrightarrow{\mathbf{a}}+t\overrightarrow{\mathbf{b}}$

B. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{a}}=\overrightarrow{\mathbf{a}}.\overrightarrow{\mathbf{b}}$

C. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{a}}=0$

D. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{b}}=0$

where t is scalar.

40. The equation of straight line passing through points $\overrightarrow{\mathbf{a}}$ and $\overrightarrow{\mathbf{b}}$ is

A. $\overrightarrow{\mathbf{r}}=(1-t)\overrightarrow{\mathbf{a}}+t\overrightarrow{\mathbf{b}}$

B. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{a}} = t\overrightarrow{\mathbf{b}}$

C. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{a}} = t\overrightarrow{\mathbf{a}}$

D. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{b}} = t\overrightarrow{\mathbf{a}}$

where t is scalar

41. The equation of line passing through the intersection of the planes $\overrightarrow{\mathbf{r}}_1.\overrightarrow{\mathbf{n_1}} = q_1$ and $\overrightarrow{\mathbf{r}}_2.\overrightarrow{\mathbf{n_2}} = q_2$ is the equation

    A. $\overrightarrow{\mathbf{r}}_1.\overrightarrow{\mathbf{n_2}} = q_1 + q_2$

    B. $\overrightarrow{\mathbf{r}} \times (\overrightarrow{\mathbf{n_1}} \times \overrightarrow{\mathbf{n_2}}) = q_1\overrightarrow{\mathbf{n_1}} - q_2\overrightarrow{\mathbf{n_2}}$

    C. $\overrightarrow{\mathbf{n_1}} \times \overrightarrow{\mathbf{n_2}} = q_1\overrightarrow{\mathbf{n_1}} - q_2\overrightarrow{\mathbf{n_2}}$

    D. $\overrightarrow{\mathbf{n_2}} \times \overrightarrow{\mathbf{n_1}} = q_2\overrightarrow{\mathbf{n_1}} - q_1\overrightarrow{\mathbf{n_2}}$

42. The condition for two straight lines $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_1}} + t\overrightarrow{\mathbf{b_1}}$ and $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_2}} + t\overrightarrow{\mathbf{b_2}}$ to be co-planar is

    A. $[\overrightarrow{\mathbf{a}}, \overrightarrow{\mathbf{b}}, \overrightarrow{\mathbf{b_2}}] = [\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b}}]$

    B. $[\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{a_2}}, \overrightarrow{\mathbf{b_2}}] = 0$

    C. $[\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}] = [\overrightarrow{\mathbf{a_2}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}]$

    D. None of these

43. The equation of plane passing through two co-planar lines $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_1}} + t\overrightarrow{\mathbf{b_1}}$ and $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_2}} + t\overrightarrow{\mathbf{b_2}}$ is

    A. $[\overrightarrow{\mathbf{r}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}] = [\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}]$

    B. $[\overrightarrow{\mathbf{a}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}] = 0$

    C. $[\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}] = [\overrightarrow{\mathbf{a_1}}, \overrightarrow{\mathbf{b_1}}, \overrightarrow{\mathbf{b_2}}]$

    D. None of these

44. The shortest distance between the lines $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_1}} + t\overrightarrow{\mathbf{b_1}}$ and $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a_2}} + t\overrightarrow{\mathbf{b_2}}$ is

A. $\frac{[\overrightarrow{\mathbf{a_1}},\overrightarrow{\mathbf{b_2}},\overrightarrow{\mathbf{b_2}}]}{|\overrightarrow{\mathbf{b_a}}\times\overrightarrow{\mathbf{b_2}}|}$

B. $\frac{[\overrightarrow{\mathbf{a_1}},\overrightarrow{\mathbf{a_2}},\overrightarrow{\mathbf{b_2}}]}{|\overrightarrow{\mathbf{b_1}}\times\overrightarrow{\mathbf{b_2}}|}$

C. $\frac{[\overrightarrow{\mathbf{b_1}},\overrightarrow{\mathbf{b_2}},\overrightarrow{\mathbf{a_1}}-\overrightarrow{\mathbf{a_2}}]}{|\overrightarrow{\mathbf{b_1}}\times\overrightarrow{\mathbf{b_2}}|}$

D. $\frac{[\overrightarrow{\mathbf{b_1}},\overrightarrow{\mathbf{a_2}},\overrightarrow{\mathbf{b_2}}]}{\overrightarrow{\mathbf{a_1}}\times\overrightarrow{\mathbf{a_2}}}$

45. The angle between planes $\overrightarrow{\mathbf{r}}_1.\overrightarrow{\mathbf{n_1}} = q_1$ and $\overrightarrow{\mathbf{r}}_2.\overrightarrow{\mathbf{n_2}} = q_2$, is

A. $\theta = cos^{-1}(\frac{\overrightarrow{\mathbf{n_1}}\times\overrightarrow{\mathbf{n_2}}}{|\overrightarrow{\mathbf{n_1}}||\overrightarrow{\mathbf{n_2}}|})$

B. $\theta = cos^{-1}(\frac{\overrightarrow{\mathbf{n_1}}.\overrightarrow{\mathbf{n_2}}}{|\overrightarrow{\mathbf{n_1}}||\overrightarrow{\mathbf{n_2}}|})$

C. $\theta = sin^{-1}(\frac{\overrightarrow{\mathbf{n_1}}.\overrightarrow{\mathbf{n_2}}}{|\overrightarrow{\mathbf{n_1}}||\overrightarrow{\mathbf{n_2}}|})$

D. $\theta = cot^{-1}(\frac{\overrightarrow{\mathbf{n_1}}\times\overrightarrow{\mathbf{n_2}}}{|\overrightarrow{\mathbf{n_1}}||\overrightarrow{\mathbf{n_2}}|})$

46. The angle between line $\frac{x-\alpha}{a_1} = \frac{y-\beta}{b_1} = \frac{z-\gamma}{c_1}$ and plane $a_2x+b_2y+c_2z = d$, is

A. $\theta = cot^{-1}(\frac{a_1a_2+b_1b_2+c_1c_2}{\sqrt{a_1^2+b_1^2+c_1^2}\sqrt{a_2^2+b_2^2+c_2^2}})$

B. $\theta = sin^{-1}(\frac{a_1a_2+b_1b_2+c_1c_2}{\sqrt{a_1+b_1+c_1}\sqrt{a_2+b_2+c_2}})$

C. $\theta = cos^{-1}(\frac{a_1a_2+b_1b_2+c_1c_2}{(a_1^2+b_1^2+c_1^2)(a_2^2+b_2^2+c_2^2)})$

D. $\theta = sin^{-1}(\frac{a_1a_2+b_1b_2+c_1c_2}{\sqrt{a_1^2+b_1^2+c_1^2}\sqrt{a_2^2+b_2^2+c_2^2}})$

47. If two planes $a_1x + b_1y + c_1z = d_1$ and $a_2x + b_2y + c_2z = d_2$ are parallel, then

A. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

B. $a_1a_2 + b_1b_2 + c_1c_2 = 0$

C. $a_1a_2 = b_1b_2 = c_1c_2$

D. $a_1 + b_1 + c_1 = 0, a_2 + b_2 + c_2 = 0$

48. The vector equation of the straight line passing through the origin and parallel to vector $\overrightarrow{\mathbf{b}}$ will be

A. $\overrightarrow{\mathbf{r}} = t\overrightarrow{\mathbf{b}}$

B. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{b}} = 0$

C. $\overrightarrow{\mathbf{r}} \times \overrightarrow{\mathbf{b}} = 0$

D. $\overrightarrow{\mathbf{a}} \times \overrightarrow{\mathbf{b}} = 0$

49. If p is the length of perpendicular from the origin to the plane and $\overrightarrow{\mathbf{n}}$ is the unit vector along this perpendicular, then the equation of plane is

A. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{n}} = p$

B. $\overrightarrow{\mathbf{r}} = p\overrightarrow{\mathbf{n}}$

C. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{p}} = n$

D. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{n}} = 0$

50. Which of the following equations represents a plane

A. $\overrightarrow{\mathbf{r}} = t\overrightarrow{\mathbf{b}}$

B. $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a}} + t\overrightarrow{\mathbf{n}}$

C. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{n}} = q$

D. $\overrightarrow{\mathbf{r}} = p.\overrightarrow{\mathbf{n}}$

51. The equation of the plane passing through the origin is

A. $\overrightarrow{\mathbf{r}} = 0$

B. $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a}}$

C. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{n}} = 0$

D. $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{n}}$

52. The vector equation of the line passing through the point $\overrightarrow{\mathbf{a}}$ and parallel to the vectors $\overrightarrow{\mathbf{b}}$ and $\overrightarrow{\mathbf{c}}$ is

A. $\overrightarrow{\mathbf{r}}.\overrightarrow{\mathbf{a}} = \overrightarrow{\mathbf{b}}.\overrightarrow{\mathbf{c}}$

B. $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a}} + t\overrightarrow{\mathbf{b}} + s\overrightarrow{\mathbf{c}}$

C. $\overrightarrow{\mathbf{r}} = \overrightarrow{\mathbf{a}} + \overrightarrow{\mathbf{b}}.\overrightarrow{\mathbf{c}}$

D. None of these