ABHINAV ACADEMY

UDUPI

CET25M11 THREE DIMENSIONAL GEOMETRY

Class 12 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 62**

1. If the direction ratios of a line are 2, 3 and -6, then direction cosines of the line making obtuse angle with Y-axis are **[1]**

   a) $\frac{-2}{7}, \frac{3}{7}, \frac{-6}{7}$
   b) $\frac{2}{7}, \frac{3}{7}, \frac{6}{7}$
   c) $\frac{-2}{7}, \frac{-3}{7}, \frac{6}{7}$
   d) $\frac{-2}{7}, \frac{-3}{7}, \frac{-6}{7}$

2. The lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x-1}{-2} = \frac{y-2}{-4} = \frac{z-3}{-6}$ are **[1]**

   a) parallel
   b) intersecting
   c) skew
   d) coincident

3. A line makes equal angles with co-ordinate axis. Direction cosines of this line are **[1]**

   a) $\pm\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$
   b) $\pm\left(\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right)$
   c) $\pm(1, 1, 1)$
   d) $\pm\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}\right)$

4. Find the angle between the following pairs of lines: $\vec{r} = 2\hat{i} - 5\hat{j} + \hat{k}$ $+\lambda\left(3\hat{i} + 2\hat{j} + 6\hat{k}.\right)$ and $\vec{r} = 7\hat{i} - 6\hat{k}$ $+\mu\left(\hat{i} + 2\hat{j} + 2\hat{k}.\right)$ $,\lambda, \mu \in R$ **[1]**

   a) $\theta = \cos^{-1}(\frac{19}{21})$
   b) $\theta = \sin^{-1}\left(\frac{19}{21}\right)$
   c) $\theta = \cot^{-1}\left(\frac{19}{21}\right)$
   d) $\theta = \tan^{-1}\left(\frac{19}{21}\right)$

5. The direction cosines of the line passing through the following points (-2, 4, -5),(1, 2, 3) is: **[1]**

   a) $\frac{-3}{\sqrt{77}}, \frac{-2}{\sqrt{77}}, \frac{-8}{\sqrt{77}}$
   b) $\frac{-3}{\sqrt{77}}, \frac{-2}{\sqrt{77}}, \frac{8}{\sqrt{77}}$
   c) $\frac{3}{\sqrt{77}}, \frac{-2}{\sqrt{77}}, \frac{8}{\sqrt{77}}$
   d) $\frac{3}{\sqrt{77}}, \frac{-2}{\sqrt{77}}, \frac{-8}{\sqrt{77}}$

6. The cartesian equation of a line is given by $\frac{2x-1}{\sqrt{3}} = \frac{y+2}{2} = \frac{z-3}{3}$ **[1]**
   The direction cosines of the line is

   a) $\frac{\sqrt{3}}{\sqrt{55}}, \frac{-4}{\sqrt{55}}, \frac{6}{\sqrt{55}}$
   b) $\frac{3}{\sqrt{55}}, \frac{4}{\sqrt{55}}, \frac{6}{\sqrt{55}}$
   c) $\frac{\sqrt{3}}{\sqrt{55}}, \frac{4}{\sqrt{55}}, \frac{6}{\sqrt{55}}$
   d) $\frac{-3}{\sqrt{55}}, \frac{4}{\sqrt{55}}, \frac{6}{\sqrt{55}}$

7. If the points A(-1, 3, 2), B(-4, 2, -2) and C(5, 5, λ) are collinear then the value of λ is **[1]**

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

8. The projections of a line segment on X, Y and Z axes are 12, 4 and 3 respectively. The length and direction cosines of the line segment are **[1]**

a) 11; $\frac{12}{11}, \frac{14}{11}, \frac{3}{11}$

b) 13; $\frac{12}{13}, \frac{4}{13}, \frac{3}{13}$

c) 19; $\frac{12}{19}, \frac{4}{19}, \frac{3}{19}$

d) 15; $\frac{12}{15}, \frac{14}{15}, \frac{3}{15}$

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

a) 7

b) -4

c) -7

d) 4

10. Direction cosines of a line perpendicular to both x-axis and z-axis are: **[1]**

a) 0, 1, 0

b) 0, 0, 1

c) 1, 1, 1

d) 1, 0, 1

11. If a line makes angles $\alpha, \beta, \gamma, \delta$ with four diagonals of a cube then $\cos^2\alpha + \cos^2\beta + \cos^2\gamma + \cos^2\theta$ is equal to **[1]**

a) $\frac{1}{3}$

b) $\frac{2}{3}$

c) $\frac{8}{3}$

d) $\frac{4}{3}$

12. If a line makes angles $\frac{\pi}{4}, \frac{3\pi}{4}$ with X-axis and Y-axis respectively, then the angle which it makes with Z-axis is **[1]**

a) π

b) $\frac{\pi}{2}$

c) 0^o

d) both 0^o and π

13. The direction ratios of the line perpendicular to the lines $\frac{x-7}{2} = \frac{y+17}{-3} = \frac{z-6}{1}$ and $\frac{x+5}{1} = \frac{y+3}{2} = \frac{z-4}{-2}$ are proportional to **[1]**

a) 4, 5, 7

b) -4, 5, 7

c) 4, -5, -7

d) 4, -5, 7

14. If the line $\frac{x-2}{2k} = \frac{y-3}{3} = \frac{z+2}{-1}$ and $\frac{x-2}{8} = \frac{y-3}{6} = \frac{z+2}{-2}$ are parallel, value of k is **[1]**

a) -2

b) 2

c) $\frac{1}{2}$

d) 4

15. Find the shortest distance between the lines $\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$ and $\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1}$ **[1]**

a) $2\sqrt{31}$

b) $2\sqrt{27}$

c) $2\sqrt{23}$

d) $2\sqrt{29}$

16. 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 **[1]**

a) (10, -10, -3)

b) (10, 10, -3)

c) (10, -10, 3)

d) (-10, 10, 3)

17. Find the angle between the following pairs of lines: $\vec{r} = 3\hat{i} + \hat{j} - 2\hat{k} + \lambda\left(\hat{i} - \hat{j} - 2\hat{k}.\right)$ and $\vec{r} = 2\hat{i} - \hat{j} - 56\hat{k} + \mu\left(3\hat{i} - 5\hat{j} - 4\hat{k}.\right)$ $, \lambda, \mu \in R$ **[1]**

a) $\theta = \cos^{-1}\left(\frac{8}{5\sqrt{3}}\right)$

b) $\theta = \cot^{-1}\left(\frac{8}{5\sqrt{3}}\right)$

c) $\theta = \sin^{-1}\left(\frac{8}{5\sqrt{3}}\right)$

d) $\theta = \tan^{-1}\left(\frac{8}{5\sqrt{3}}\right)$

18. If the projections of $\overrightarrow{PQ}$ on OX, OY, OZ are respectively 1, 2, 3 and 4, then the magnitude of $\overrightarrow{PQ}$ is **[1]**

a) 13

b) 169

c) 19

d) 144

19. A line is perpendicular to two lines having direction ratios 1, -2, -2 and 0, 2, 1. The direction cosines of the line are **[1]**

a) $\frac{1}{3}, \frac{-1}{3}, \frac{2}{3}$

b) $\frac{2}{3}, \frac{1}{3}, \frac{-1}{3}$

c) $\frac{2}{3}, \frac{-1}{3}, \frac{2}{3}$

d) $\frac{-2}{3}, \frac{1}{3}, \frac{2}{3}$

20. Find the values of p so that the lines $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}\ and\ \frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$ are at right angles. **[1]**

a) $p = \frac{70}{11}$

b) $p = \frac{70}{12}$

c) $p = \frac{72}{15}$

d) $p = \frac{71}{13}$

21. The angle between the lines 2x = 3y = -z and 6x = -y = -4z is **[1]**

a) 90^o

b) 0^o

c) 45^o

d) 30^o

22. The direction ratios of two lines are 3, 2, -6 and 1, 2, 2 respectively. The acute angle between these lines is **[1]**

a) $\cos^{-1}\left(\frac{5}{18}\right)$

b) $\cos^{-1}\left(\frac{8}{21}\right)$

c) $\cos^{-1}\left(\frac{5}{21}\right)$

d) $\cos^{-1}\left(\frac{3}{20}\right)$

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

a) $\frac{-10}{7}$

b) $\frac{5}{7}$

c) $\frac{-5}{7}$

d) $\frac{10}{7}$

24. The equation of a line passing through point (2, -1, 0) and parallel to the line $\frac{\mathrm{x}}{1} = \frac{\mathrm{y}-1}{2} = \frac{2-\mathrm{z}}{2}$ is: **[1]**

a) $\frac{\mathrm{x}+2}{1} = \frac{\mathrm{y}-1}{2} = \frac{\mathrm{z}}{2}$

b) $\frac{\mathrm{x}+2}{1} = \frac{\mathrm{y}-1}{2} = \frac{\mathrm{z}}{-2}$

c) $\frac{\mathrm{x}-2}{1} = \frac{\mathrm{y}+1}{2} = \frac{\mathrm{z}}{-2}$

d) $\frac{\mathrm{x}-2}{1} = \frac{\mathrm{y}-1}{2} = \frac{\mathrm{z}}{2}$

25. If lines $\frac{2x-2}{2k} = \frac{4-y}{3} = \frac{z+2}{-1}$ and $\frac{x-5}{1} = \frac{y}{k} = \frac{z+6}{4}$ are at right angles, then the value of k is **[1]**

a) -2

b) 4

c) 0

d) 2

26. The direction ratios of the line x - y + z - 5 = 0 = x - 3y - 6 are proportional to **[1]**

a) 3, 1, - 2

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

c) 2, - 4, 1

d) $\frac{2}{\sqrt{41}}, \frac{-4}{\sqrt{41}}, \frac{1}{\sqrt{41}}$

27. 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 **[1]**

a) $\vec{r} \cdot (5\hat{i} - 2\hat{j} + 4\hat{k}) = \sqrt{14}$

b) $\vec{r} \cdot (5\hat{i} + 2\hat{j} - 4\hat{k}) = \sqrt{12}$

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

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

28. The vector equation of a line which passes through the point (2, -4, 5) and is parallel to the line $\frac{\mathrm{x}+3}{3} = \frac{4-\mathrm{y}}{2} = \frac{\mathrm{z}+8}{6}$ is: **[1]**

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

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

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

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

29. Equation of a line passing through point (1, 1, 1) and parallel to z-axis is **[1]**

a) $\frac{x}{1} = \frac{y}{1} = \frac{z}{1}$
b) $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-1}{1}$
c) $\frac{x-1}{0} = \frac{y-1}{0} = \frac{z-1}{1}$
d) $\frac{x}{0} = \frac{y}{0} = \frac{z-1}{1}$

30. The lines l_1 and l_2 intersect. The shortest distance between them is **[1]**

a) infinity
b) negative
c) positive
d) zero

31. If O is the origin, OP = 3 with direction ratios proportional to - 1, 2, - 2 then the coordinates of P are **[1]**

a) (3, 6 , - 9)
b) (1 , 2 , 2)
c) (- 1 , 2 , - 2)
d) $(\frac{-1}{9}, \frac{2}{9}, \frac{-2}{9})$

32. The angle between a line with direction ratios 2 : 2 : 1 and a line joining (3, 1, 4) to (7, 2, 12) **[1]**

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

33. If a vector makes an angle of $\frac{\pi}{4}$ with the positive directions of both x-axis and y-axis, then the angle which it makes with positive z-axis is: **[1]**

a) 0
b) $\frac{\pi}{4}$
c) $\frac{3\pi}{4}$
d) $\frac{\pi}{2}$

34. An angle between two diagonals of a cube is **[1]**

a) $\cos^{-1}\left(\frac{8}{5}\right)$
b) $\cos^{-1}\left(\frac{1}{3}\right)$
c) $\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)$
d) $\cos^{-1}\left(\frac{9}{5}\right)$

35. The angle between the lines $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-1}{2}$ and $\frac{x-1}{-\sqrt{3}-1} = \frac{y-1}{\sqrt{3}-1} = \frac{z-1}{4}$ is **[1]**

a) $\frac{\pi}{3}$
b) $\frac{\pi}{4}$
c) $\frac{\pi}{6}$
d) $\cos^{-1}\left(\frac{1}{65}\right)$

36. The direction ratios of two lines are a, b, c and (b - c), (c - a), (a - b) respectively. The angle between these lines is **[1]**

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

37. Find the equation of the line which passes through the point (1, 2, 3) and is parallel to the vector $3\hat{i} + 2\hat{j} - 2\hat{k}$. **[1]**

a) $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 2\hat{k}.\right)$, $\lambda \in R$
b) $\vec{r} = \widehat{2i} + 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 2\hat{k}.\right)$ $\lambda \in R$
c) $\vec{r} = 4\hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 2\hat{k}.\right)$ $\lambda \in R$
d) $\vec{r} = 3\hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 2\hat{k}.\right)$ $\lambda \in R$

38. The vector equation of the x-axis is given by **[1]**

a) $\vec{r} = \hat{j} + \hat{k}$
b) $\vec{r} = \hat{j} - \hat{k}$
c) $\vec{r} = \hat{i}$
d) $\vec{r} = \lambda\hat{i}$

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

a) $\cos^{-1}\left(\frac{2}{3}\right)$

b) $\cos^{-1}\left(\frac{3}{4}\right)$

c) $\frac{\pi}{3}$

d) $\cos^{-1}\left(\frac{5}{6}\right)$

40. The sum of the direction cosines of Z-axis is **[1]**

a) 3

b) 0

c) 2

d) 1

41. Direction cosines of the line $\frac{x-1}{2}=\frac{1-y}{3}=\frac{2z-1}{12}$ are: **[1]**

a) $\frac{2}{7},\frac{3}{7},\frac{6}{7}$

b) $\frac{2}{7},-\frac{3}{7},-\frac{6}{7}$

c) $\frac{2}{7},-\frac{3}{7},\frac{6}{7}$

d) $\frac{2}{\sqrt{157}},-\frac{3}{\sqrt{157}},\frac{12}{\sqrt{157}}$

42. If (a_1, b_1, c_1) and (a_2, b_2, c_2) be the direction ratios of two parallel lines then **[1]**

a) $a_1^2+b_1^2+c_1^2=a_2^2+b_2^2+c_2^2$

b) $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

c) $a_1 = a_2, b_1 = b_2, c_1 = c_2$

d) $a_1a_2 + b_1b_2 + c_1c_2 = 0$

43. The perpendicular distance of the point P (1, 2, 3) from the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$ is **[1]**

a) 4

b) 5

c) 7

d) 0

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

a) $\cos^{-1}\left(\frac{3}{8}\right)$

b) $\frac{\pi}{3}$

c) $\frac{\pi}{6}$

d) $\frac{\pi}{2}$

45. Find the shortest distance between the lines $\vec{r}=(1-t)\,\hat{i}+(t-2)\,\hat{j}+(3-2t)\hat{k}$ and $\vec{r}=(s+1)\,\hat{i}+(2s-1)\,\hat{j}-(2s+1)\hat{k}$ **[1]**

a) $\frac{8}{\sqrt{31}}$

b) $\frac{8}{\sqrt{35}}$

c) $\frac{8}{\sqrt{29}}$

d) $\frac{8}{\sqrt{33}}$

46. The shortest distance between the lines $\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$ and $\frac{x+3}{-3}=\frac{y+7}{2}=\frac{z-6}{4}$ is **[1]**

a) $5\sqrt{30}$

b) $\sqrt{30}$

c) $2\sqrt{30}$

d) $3\sqrt{30}$

47. The acute angle between the lines x - 2 = 0 and $\sqrt{3}x-y-2=0$ is **[1]**

a) 60^o

b) 0^o

c) 45^o

d) 30^o

48. Find the shortest distance between the lines whose vector equations are $\vec{r}=\hat{i}+2\hat{j}+3\hat{k}+\lambda\left(\hat{i}-3\hat{j}+2\hat{k}\right)$ and $\vec{r}=4\hat{i}+5\hat{j}+6\hat{k}+\mu\left(2\hat{i}+3\hat{j}+\hat{k}\right)$ **[1]**

a) $\frac{3}{\sqrt{17}}$

b) $\frac{3}{\sqrt{23}}$

c) $\frac{3}{\sqrt{27}}$

d) $\frac{3}{\sqrt{19}}$

49. The straight line $\frac{x-3}{3}=\frac{y-2}{1}=\frac{z-1}{0}$ is **[1]**

a) perpendicular to z-axis
b) parallel to z-axis
c) parallel to y-axis
d) parallel to x-axis

50. Find the shortest distance between the lines $\vec{r}=\hat{i}+2\hat{j}+\hat{k}+\lambda\left(\hat{i}-\hat{j}+\hat{k}.\right)$ $and\ \vec{r}=2\hat{i}-\hat{j}-\hat{k}+\mu\left(2\hat{i}+\hat{j}+\widehat{2k}.\right)$, $\lambda,\mu\in R$ **[1]**

a) $\frac{4\sqrt{2}}{2}$
b) $\frac{3\sqrt{2}}{5}$
c) $\frac{3\sqrt{2}}{2}$
d) $\frac{5\sqrt{2}}{2}$

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

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

52. If α,β,γ are the angles that a line makes with the positive direction of x, y, z axis, respectively, then the direction cosines of the line are **[1]**

a) tan α, tan β, tan γ
b) sin α, sin β, sin γ
c) cos α, cos β, cos γ
d) $\cos^2\alpha$, $\cos^2\beta$, $\cos^2\gamma$

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

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

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

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

55. The angle between the straight lines $\frac{x+1}{2}=\frac{y-2}{5}=\frac{z+3}{4}$ and $\frac{x-1}{1}=\frac{y+2}{2}=\frac{z-3}{-3}$ is **[1]**

a) 45°
b) 60°
c) 30°
d) 90°

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

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

57. If the direction ratios of a line are proportional to 1, - 3, 2, then its direction cosines are **[1]**

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

58. The angle between the lines $\vec{r}=(3\hat{i}+\hat{j}-2\hat{k})+\lambda(\hat{i}-\hat{j}-2\hat{k})$ and $\vec{r}=(2\hat{i}-\hat{j}-5\hat{k})+\mu(3\hat{i}-5\hat{j}-4\hat{k})$ is **[1]**

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

59. If the directions cosines of a line are k,k,k, then **[1]**

a) k $>$ 0
b) k = 1

c) $0 < k < 1$

d) $k = \frac{1}{\sqrt{3}}$ or $k = -\frac{1}{\sqrt{3}}$

60. The direction ratios of a line parallel to z-axis are: **[1]**

a) $< 0, 0, 0 >$

b) $< 1, 1, 0 >$

c) $< 1, 1, 1 >$

d) $< 0, 0, 1 >$

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

a) $\frac{\pi}{4}$

b) $\frac{\pi}{3}$

c) $\frac{\pi}{6}$

d) $\frac{\pi}{2}$

62. If the direction cosines of a line are $\left(\frac{1}{a}, \frac{1}{a}, \frac{1}{a}\right)$, then: **[1]**

a) $0 < a < 1$

b) $a > 2$

c) $a = \pm\sqrt{3}$

d) $a > 0$