

**INTERNATIONAL INDIAN SCHOOL BURAIADAH**  
**WORK SHEET-2025-26**  
**SUBJECT: MATHS**  
**CHAPTER: THREE DIMENSIONAL GEOMETRY**

**MCQ**

- 1-The coordinates of the foot of the perpendicular drawn from the points (2,-3,4) on the y-axis is  
 (a) (2,3,4) (b) (-2, -3, -4) (c) (0, -3, 0) (d) (2, 0, 4)
- 2-If a line makes angle  $\alpha$ ,  $\beta$  and  $\gamma$  with the axes respectively, then  $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$   
 (a) -2 (b) -1 (c) 1 (d) 2
- 3-Direction cosines of the line  $\frac{x-1}{2} = \frac{y-3}{3} = \frac{z-12}{12}$  are  
 (a)  $\frac{2}{7}, \frac{3}{7}, \frac{6}{7}$  (b)  $\frac{2}{\sqrt{157}}, -\frac{3}{\sqrt{157}}, \frac{12}{\sqrt{157}}$  (c)  $\frac{2}{7}, -\frac{3}{7}, -\frac{6}{7}$  (d)  $\frac{2}{7}, -\frac{3}{7}, \frac{6}{7}$
- 4- if a line makes angle of  $90^\circ$ ,  $135^\circ$ ,  $45^\circ$  with the x, y and z axes respectively, then it direction cosines are  
 (a)  $0, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$  (b)  $-\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}$  (c)  $\frac{1}{\sqrt{2}}, 0, -\frac{1}{\sqrt{2}}$  (d)  $0, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$
- 5-Equation of line passing through point (1, 1, 1) and parallel to z-axis is  
 (a)  $\frac{x}{1} = \frac{y}{1} = \frac{z}{1}$  (b)  $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-1}{1}$  (c)  $\frac{x}{0} = \frac{y}{0} = \frac{z-1}{1}$  (d)  $\frac{x-1}{0} = \frac{y-1}{0} = \frac{z-1}{1}$
- 6-The equation of x-axis in space are  
 (a)  $X=0, y=0$  (b)  $x=0, z=0$  (c)  $x=0$  (d)  $y=0, z=0$
- 7-If the point (a,b,0) lies on the line  $\frac{x+1}{2} = \frac{y+2}{3} = \frac{z+3}{4}$ , then (a,b) is  
 (a) (1, 2) (b)  $(\frac{1}{2}, \frac{2}{3})$  (c)  $(\frac{1}{2}, \frac{1}{4})$  (d) (0,0)
- 8-The Shortest distance between the lines given by  
 $\vec{r} = (8 + 3\lambda)\hat{i} - (9 + 16\lambda)\hat{j} + (10 + 7\lambda)\hat{k}$  and  $\vec{r} = 15\hat{i} + 29\hat{j} + 5\hat{k} + \mu(3\hat{i} + 8\hat{j} - 5\hat{k})$  is  
 (a) 7 units (b) 2 units (c) 14 units (d) 3 units
- 9-The image of the point (1, 6, 3) in the line  $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$   
 (a) (2,0,5) (b) (1, 3, 4) (c) (1, 0, 7) (d) (-3, -2, 0)
- 10-The angle between the lines  $2x = 3y = -z$  and  $6x = -y = -4z$  is  
 (a)  $0^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $90^\circ$

**Assertion -Reason Questions**

The following questions consist of two statements -Assertion (A) and Reason(R) .Answer these questions selecting the appropriate option given below :

- (a) Both A and R true and R is the correct explanation for A.
- (b) Both A and R are true but R is not the correct explanation for A
- (c) A is true but R is false.
- (d) A is false but R is true .

**1-Assertion (A):** A line through the points (4,7,8) and (2,3,4) is parallel to a line through the points (-1, -2, 1) and (1,2,5)

**Reason (R)** Lines  $\vec{r} = \vec{a}_1 + \lambda\vec{b}_1$  and  $\vec{r} = \vec{a}_2 + \mu\vec{b}_2$  are parallel if  $\vec{b}_1 \cdot \vec{b}_2 = 0$  (CBSE-2023)

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**2- Assertion (A) :**Equation of line passing through the points (1,2,3) and (3, -1,3) is

$$\frac{x-3}{2} = \frac{y+1}{3} = \frac{z-3}{0}$$

**Reason (R) :** Equation of line passing through points  $(x_1, y_1, z_1)$  and  $(x_2, y_2, z_2)$  is given by

$$\frac{x-x_1}{x_2-x_1} = \frac{y-y_1}{y_2-y_1} = \frac{z-z_1}{z_2-z_1}$$

### **Subjective Questions:**

1-Write the direction cosines of a line parallel to Z-axis (CBSE-2012)

2-Find the value of p , so that lines  $\frac{x-1}{-2} = \frac{y-4}{3p} = \frac{z-3}{4}$  and  $\frac{x-2}{4p} = \frac{y-5}{2} = \frac{1-z}{7}$  are perpendicular to each other.(CBSE-2023)

3- Find the vector and the cartesian equations of a line that passes through the point A (1 ,2 ,-1) and parallel to the line  $5x - 25 = 14 - 7y = 35z$  . (CBSE-2023)

4-Find the coordinates of points on line  $\frac{x}{1} = \frac{y-1}{2} = \frac{z+1}{2}$  which are at a distance of  $\sqrt{11}$  units from origin.(CBSE-2019)

5-Show that the line through the points (1 , -1 ,2) (3 , 4 ,-2) is perpendicular to the line through the points (0 , 3 ,2) and (3 ,5 ,6)

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

7-Find the coordinate of the foot of the perpendicular drawn from the point P(0,2 ,3) to the line

$$\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3} \quad \text{(CBSE-2023)}$$

8-Find the vector and cartesian equations of the line passing through the point (1 , 2 ,- 4) and perpendicular to the two lines  $\frac{x-8}{3} = \frac{y+19}{-16} = \frac{z-10}{7}$  and  $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$  .(CBSE-2012,2017)

9-Find the equation of a line passing through the point (1 ,2 ,-4) and perpendicular to two lines  $\vec{r} = 8\hat{i} - 19\hat{j} + 10\hat{k} + \lambda(3\hat{i} - 16\hat{j} - 7\hat{k})$  and  $\vec{r} = 15\hat{i} + 29\hat{j} + 5\hat{k} + \mu(3\hat{i} + 8\hat{j} - 5\hat{k})$  (CBSE-2015)

10-Find the shortest distance between the following lines :

$$\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1} \text{ and } \frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1} \quad \text{(CBSE-2008 , 2013 ,2014 )}$$

11-Find the value of b so that the lines  $\frac{x-1}{2} = \frac{y-b}{3} = \frac{z-3}{4}$  and  $\frac{x-4}{5} = \frac{y-1}{2} = z$  are intersecting lines .Also ,find the point of intersection of these given lines. (CBSE-2023)

12-Find the equations of all the sides of the parallelogram ABCD whose vertices are A(4 , 7 ,8) ,B(2,3,4),C(-1 , -2 ,1) and D (1,2,5) .Also ,find the coordinates of the foot of perpendicular from A to CD

13-Find the vector and the cartesian equations of a line passing through the point ( 1 , 2 ,-4) and parallel

to the line joining the points A(3, 3, -5) and B (1, 0, -11) Hence find the distance between the two lines.

14-Find the value of  $a + b + c$  where  $(a, b, c)$  is the image of  $(1, 2, -3)$  in the line  $\frac{x+1}{2} = \frac{y-3}{-2} = \frac{z}{-1}$

15-If a point R  $(4, y, z)$  lies on the line segment joining the points P(2, -3, 4) and Q (8, 0, 10) .Find the distance of R from origin.

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