MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

THREE DIMENSIONAL CO-ORDINATES

Solved Problems

1. Show that the point `A(-4, 9, 6), B(-1,6,6), C(0,7,10) form a right angled isosceles triangle.

2. Show that the point whose distance from Y-axis in thrice its distance from (1,2,-1) satisfies the equation

$$8x^2 + 9y^2 + 8z^2 - 18x - 36y + 18z + 54 = 0$$

.

3. A, B, C are three points $\overrightarrow{\otimes}, \overrightarrow{oy}, \overrightarrow{oz}$ respectively at a distances of a, b, c $(a \neq 0, b \neq 0, c \neq 0)$ from the origin O. Find the coordinates of the point which is equidistant from A, B, C and O.

4. If the point A(3, -2, 4), B(1, 1, 1) and C(-1, 4, -2) are collinear then $(C:AB) =$

5. Find the ratio in which YZ-plane divides the line joining A(2,4,5) and B(3,5,-4). Also find the point of intersection.

6. Show that the points $A(3, -2, 4), B(1, 1, 1), C(-1, 4, -2)$ are collinear.

7. Find the fourth vertex of the parallelogram whose consecutive vertices are $(2, 4, -1), (3, 6, -1)$ and $(4, 5, 1)$.

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8. A(5,4,6), B(1,-1,3),C(4,3,2) are three points. Find the coordinates of the point in which the bisector of $\lfloor BAC$ meets the side BC.

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9. If (x_1, y_1, z_1) and (x_2, y_2, z_2) are two vertices and (α, β, γ) is the centroid of a triangle, find the third vertex of the triangle.

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10. If $D(x_1, y_1, z_1), E(x_2, y_2, z_2)$ and $F(x_3, y_3, z_3)$ are the midpoints of the sides BC, CA and AB respectively of a triangle, find its vertices A, B and C.

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11. If $M(\alpha, \beta, \gamma)$ is the mid point of the line segment joining the points $A(x_1, y_1, z_1)$ and B then find B.

12. If H, G, S and I respectively denote orthocentre, centroid, circumcentre and in-centre of a triangle formed by the points (1, 2, 3), (2, 3, 1) and (3, 1, 2), then find H, G, S, I

13. Find the incentre of the triangle formed by the points (0, 0, 0), (3, 0, 0) and (0, 4, 0).

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14. If the point (1, 2, 3) is changed to the point (2, 3, 1) through translation of axes, find the new origin.

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15. Find the ratio in which the point P(5,4,-6) divides the line segment joining the points A(3,2,-4) and B(9,8,-10) . Also find the harmonic conjugate of P.

Textual Exercises Exercise 5 A

1. Find the distance of P(3, -2, 4) from the origin.

2. Find the distance between the points

(3,4,-2)and(1,0,7)

3. Find x if the distance between (5,-1,7) and

(x,5,1) is 9 units.

4. Show that the points (2, 3, 5), (-1, 5, -1) and (4, -3, 2) form a right angled isosceles triangle.

5. Show that the points (1,2,3), (2,3,1) and (3,1,2) form an equilateral triangle.

6. P is a variable point which moves such that 3PA =2PB. If A(-2,2,3) and B=(13,-3,13) prove that P satisfies the equation.

$$x^2 + y^2 + z^2 + 28x - 12y + 10z - 247 = 0$$

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7. Show that the point (1 , 2 , 3), (7 , 0 1), (- 2, 3, 4) are collinear.

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8. Show that ABCD is a square where A,B,C,D are the points (0,4,1),(2,3,-1),(4,5,0) and (2,6,2) respectively.

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Textual Exercises Exercise 5 B

1. Find the ratio in which the XZ-plane divides the line joining A(-2,3,4) and B(1,2,3)

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2. Find the coordinates of the vertex 'C' of ΔABC if its centroid is the origin and the vertices A,B are (1,1,1) are (-2,4,1) respectively.

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3. If (3,2,-1),(4,1,1) and (6,2,5) are three vertices and (4,2,2) is the centroid of a tetrahedro, find the fourth vertex to that tetrahedron.

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4. Find the distance between the mid point of the line segment $\overline{AB}$ and the point $(3,\ -1,\ 2)$ where A = (6,3,-4), B = (-2,-1,2).

5. Show that the points (5,4,2),(6,2,-1) and(8,-2,-7)` are collinear.

6. Show that the points $A(3, 2, -4)$, $B(5, 4, -6)$ and $C(9, 8, -10)$ are collinear and find the ratio in which B divides $\overline{AC}$.

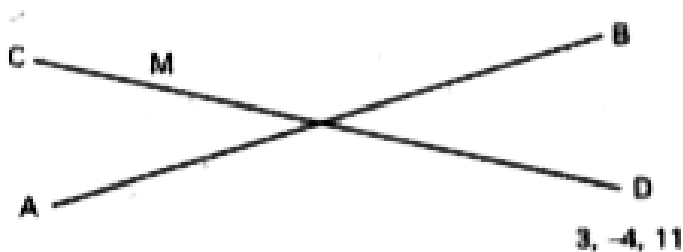**7.** If A(4,8,12), B(2,4,6), C(3,5,4) and D(5,8,5) are four points, show that the lines $\overrightarrow{AB}$ and $\overrightarrow{CD}$ intersect.

8. Find the point of intersection of the lines A B and C , where.A = (7, -6,1) B = (17, -18, -3), C = (1, 4, -5) and O = (3, -4,11)

9. A(3, 2, 0), B(5, 3, 2), C(-9, 6, -3) are three points forming a triangle and AD, the external

bisector of BAC, meeting BC at D then find D.

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10. Show that the points O(0,0,0), A(2,-3,3) B(-2,3,-3) are collinear. Find the ratio in which each point divides the segment joining the other two.

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