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CLASS 11TH | MATHS

CHAPTER MODULE

INTRODUCTION TO 3D

CHAPTER 12

Section–A (1 Mark Questions)

01. The locus of a point for which $x = 0$ is _____.

02. L is the foot of the perpendicular drawn from a point P $(3, 4, 5)$ on the xy-plane. What are the coordinates of point L.

03. What is the distance from origin to point (a, b, c).

04. Find Mid-point of the line segment joining the points $(1, 3, 5)$ and $(2, 4, 3)$.

05. If a point P lies in yz-plane, then the coordinates of a point on yz-plane is of the form

Section–B (2 Marks Questions)

06. If the distance between the points $(a, 0, 1)$ and $(0, 1, 2)$ is $\sqrt{27}$, then find the value of a.

07. If a parallelepiped is formed by planes drawn through the points $(5, 8, 10)$ and $(3, 6, 8)$ parallel to the coordinate planes, then what is the length of diagonal of the parallelepiped.

08 Locate the following points in respective octants:
(i) $(1, -1, 3)$
(ii) $(-1, 2, 4)$
(iii) $(-2, -4, -7)$
(iv) $(-4, 2, -5)$

09. Find the distance between the points $P(1, -3, 4)$ and $Q(-4, 1, 2)$.

10. Find the distance of the point $\left(x, y, \sqrt{1 \quad x^2 \quad y^2}\right)$ from the origin.

11. Find the centroid of a triangle, the mid-point of whose sides are $D(1, 2, -3)$, $E(3, 0, 1)$ and $F(-1, 1, -4)$.

12. Show that the points $A(1, 2, 3)$, $B(-1, -1, -1)$ and $C(3, 5, 7)$ are collinear.

13. Find the coordinates of the point which divides the join of $P(2, -1, 4)$ and $Q(4, 3, 2)$ in the ratio $2 : 5$ externally.

Section–C (3 Marks Questions)

14. Let A, B, C be the feet of perpendiculars from a point P on the x, y, z-axis respectively. Find the coordinates of A, B and C in each of the following where the point P is
(i) $(3, 4, 2)$
(ii) $(-5, 3, 7)$
(iii) $(4, -3, -5)$

15. Show that the point $A(1, -1, 3)$, $B(2, -4, 5)$ and $C(5, -13, 11)$ are collinear.

16. Show that the triangle ABC with vertices $A(0, 4, 1)$, $B(2, 3, -1)$ and $C(4, 5, 0)$ is right angled.

17. Find the third vertex of triangle whose centroid is origin, and two vertices are $(2, 4, 5)$ and $(0, -2, -5)$.

18. Three consecutive vertices of a parallelogram ABCD are $A(6, -2, 4)$, $B(2, 4, -8)$, $C(-2, 2, 4)$. Find the coordinates of the fourth vertex.

19. Find the coordinate of the points which trisect the line segment joining the points $A(2, 1, -3)$ and $B(5, -8, 3)$.

20. If the origin is the centroid of a triangle ABC having vertices $A(a, 1, 3)$, $B(-2, b, -5)$ and $C(4, 7, c)$, find the values of a, b, c.

21. Let $A(2, 2, -3)$, $B(5, 6, 9)$ and $C(2, 7, 9)$ be the vertices of a triangle. The internal bisector of the angle A meets BC at the point D. Find the coordinates of D.

22. Find the ratio in which the line segment joining the points $(4, 8, 10)$ and $(6, 10, -8)$ is divided by the YZ-plane.

23. Find the coordinates of a point equidistant from the four points $O(0, 0, 0)$, $A(\ell, 0, 0)$, $B(0, m, 0)$ and $C(0, 0, n)$.

24. What are the coordinates of the vertices of a cube whose edge is 2 units, one of whose vertices coincides with the origin and the three edges passing through the origin, coincides with the positive direction to the axes through the origin.

Section–D (5 Marks Questions)

25. The mid-points of the sides of a triangle are $(5, 7, 11)$, $(0, 8, 5)$ and $(2, 3, -1)$. Find its vertices.

26. Find the equation of the set of points P, the sum of whose distances from $A(4, 0, 0)$ and $B(-4, 0, 0)$ is equal to 10.

27. Find the coordinates of the point which divides the line segment joining the points $(1, -2, 3)$ and $(3, 4, -5)$ in the ratio $2 : 3$
    (i) internally, and
    (ii) externally.

28. Show that the three points $A(2, 3, 4)$, $B(-1, 2, -3)$ and $C(-4, 1, -10)$ are collinear and find the ratio in which C divides AB.

29. The mid-point of the sides of a triangle are $(1, 5, -1)$, $(0, 4, -2)$ and $(2, 3, 4)$. Find its vertices. Also find the centroid of the triangle.

30. A point R with x-coordinate 4 lies on the line segment joining the points $P(2, -3, 4)$ and $Q(8, 0, 10)$. Find the coordinates of the point.

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ANSWER KEY

1. $(0, y, z)$

2. $(3, 4, 0)$

3. $\sqrt{a^2 + b^2 + c^2}$

4. $\left(\frac{3}{2}, \frac{7}{2}, 4\right)$

5. $(0, y, z)$

6. $a = \pm 5$

7. $2\sqrt{3}$

8. (i) IV octant, (ii) II octant, (iii) VII octant, (iv) VI octant

9. $3\sqrt{5}$ units

10. 1

11. $(1, 1, -2)$

13. $R\left(\frac{2}{3}, \frac{-11}{3}, \frac{16}{3}\right)$

14. (i) $A = (3, 0, 0), B = (0, 4, 0), C = (0, 0, 2)$
(ii) $A = (\ -5, 0, 0), B = (0, 3, 0), C = (0, 0, 7)$
(iii) $A = (4, 0, 0), B = (0, -3, 0), C = (0, 0, -5)$

17. $(\text{-}\text{-}2, \text{-}\text{-}2, \ -1)$

18. $(2, -4, 16)$

19. $(4, -5, 1)$

20. $a = -2, b = -8$ and $c = 2$

21. $\left(\frac{7}{2}, \frac{13}{2}, 9\right)$

22. $2:3$

23. $\left(\frac{l}{2}, \frac{m}{2}, \frac{n}{2}\right)$

24. $A(2,0,0), B(2,2,0), C(0,2,0), D(0,2,2), E(0,0,2), F(2,0,2), G(2,2,2)$

25. $(-3,4,-7), (7,2,5)$ and $(3,12,17)$

26. $9x^2 + 25y^2 + 25z^2 - 225 = 0$

27. (i) $\left(\frac{9}{5}, \frac{2}{5}, \frac{-1}{5}\right)$, (ii) $(-3,-14,19)$

28. $2:1$

29. $\left(\frac{3}{2}, 6, \frac{1}{2}\right)$

30. $(4,-2,6)$