



GOVERNMENT OF KARNATAKA

DEPARTMENT OF SCHOOL EDUCATION (PRE-UNIVERSITY)

18TH CROSS, MALLESHWARAM, BENGALURU – 560 012

CHAPTERWISE MULTIPLE CHOICE QUESTIONS FOR COMPETATIVE EXAM

SUBJECT: **MATHEMATICS – I PUC**

NAME OF THE CHAPTER: **INTRODUCTION TO THREE DIMENSIONAL GEOMETRY**



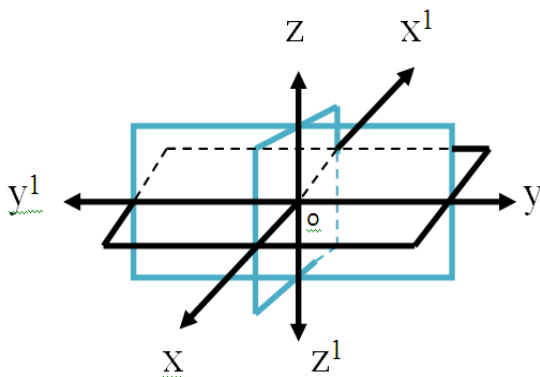
Co-ordinate axes & Co-ordinate plane

Consider the three planes which are intersecting mutually perpendicular to each other at O(origin).

The intersecting lines x o x^1 , y o y^1 , z o z^1 are perpendicular to each other these lines are called x , y , z axes. ox , oy , oz are +ve sides & ox^1 , oy^1 , oz^1 are –ve sides

The planes xoy , yoz & zox are called xy -plane, yz -plane, zx -plane respectively these three known as co-ordinate planes.

The three co-ordinate planes divided the space into eight parts are called octants, named as $xoyz$, x^1oyz , x^1oy^1z , xoy^1z , $xoyz^1$, x^1oz^1 , $x^1oy^1z^1$ & denoted by I, II, III, IV, V, VI, VII, VIII octants respectively



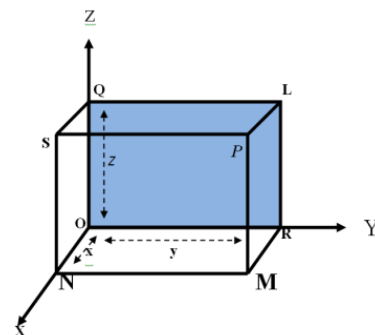
Co-ordinates of a point in space

Let p (x , y , z) be a point in a space it is called as ordered triplet.

If Draw $PM \perp XY$ plane $\therefore PM = OQ = z$

Draw $PL \perp ZY$ plane $\therefore PL = ON = x$

Draw $PS \perp XZ$ plane $\therefore PS = OR = y$



Then x, y, z are called the x, y, z co-ordinates respectively (all are +ve).

- ✓ The co-ordinate of a point P on the x -axis, y -axis, z -axis are $(x, 0, 0), (0, y, 0), (0, 0, z)$, respectively
- ✓ The co-ordinate of a point P on the xy -plane, yz -plane, zx -plane are $(x, y, 0), (0, y, z), (x, 0, z)$ respectively.
- ✓ The signs of x, y & z would change accordingly. To each point in the space there corresponds an order triplet of real number

Signs of the Co-ordinates of a point in each octant as follows

Octant→ Co-ordinate ↓	I	II	III	IV	V	VI	VII	VIII
X	+	-	-	+	+	-	-	+
Y	+	+	-	-	+	+	-	-
Z	+	+	+	+	-	-	-	-

Formula to remember

- Distance between two points A (x_1, y_1, z_1) & B (x_2, y_2, z_2) is

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

- Distance between origin & any point P (x, y, z) is $OP = \sqrt{x^2 + y^2 + z^2}$

- Distance of the point (a, b, c) from

i) x -axis is $\sqrt{b^2 + c^2}$ ii) y -axis is $\sqrt{a^2 + c^2}$ iii) z -axis is $\sqrt{a^2 + b^2}$

- Co-ordinates of centroid of a triangle whose vertices P (x_1, y_1, z_1) , Q (x_2, y_2, z_2) &

R (x_3, y_3, z_3) is $G = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}, \frac{z_1 + z_2 + z_3}{3} \right)$

Coordinates of a point in space

1. **The point $(1, -3, 4)$ lies in the octant** **(Easy) (KCET-2020)**
(a) Third (b) Fourth (c) Eighth (d) Second (Easy)
2. **The octant in which the point $(2, -4, -7)$ lies is** **(Easy) (KCET-2021)**
(a) Eighth (b) Fourth (c) Third (d) Fifth (Easy)
3. **Find the octant in which the points $(-3, 1, 2)$ and $(-3, 1, -2)$ lie respectively.** **(Easy)**
(a) second, fourth (b) sixth, second
(c) fifth, sixth (d) second, sixth
4. **M is the foot of the perpendicular drawn from the point $A(6, 7, 8)$ on the yz -plane. What are the coordinates of point M ?** **(Average)**
(a) $(6, 0, 0)$ (b) $(6, 7, 0)$ (c) $(6, 0, 8)$ (d) $(0, 7, 8)$
5. **Let A, B, C be the feet of the perpendicular segments drawn from a point $P(3, 4, 5)$ on the xy, yz & zx planes respectively. The Co-ordinates of A, B & C** **(Average)**
(a) $(3, 4, 0), (0, 4, 4), (3, 0, 5)$ (b) $(3, 0, 4), (4, 5, 0), (3, 5, 0)$
(c) $(3, 5, 0), (0, 5, 4), (0, 3, 4)$ (d) $(3, 4, 0), (0, 4, 5), (3, 0, 5)$
6. **L is the foot of the perpendicular drawn from a point $(3, 5, 6)$ on x - axis the Co-ordinates of L are.** **(Average)**
(a) $(3, 0, 0)$ (b) $(0, 6, 0)$ (c) $(0, 0, 5)$ (d) $(0, 5, 6)$
7. **If $P(2, 4, 5)$ point in the space and PF perpendicular to xy -plane, then coordinate of point F is** **(Average)**
(a) $(0, 0, 5)$ (b) $(0, 4, 5)$ (c) $(2, 0, 5)$ (d) $(2, 4, 0)$
8. **The equation $xy = 0$ in three dimensional space represents** **(Difficult) (KCET-2024)**
(a) A pair of straight line (b) a plane
(c) a pair of planes at right angles (d) a pair of parallel planes
9. **The locus of a point for which $y = 0, z = 0$?** **(Average)**
(a) equation of x -axis (b) equation of y -axis
(c) equation of z -axis (d) yz - plane
10. **The x - axis is the intersection of two planes** **(Average)**
(a) xy and xz (b) yz and zx (c) xy and yz (d) xy and yx
11. **Equation of x -axis is considered as** **(Easy)**
(a) $x = 0, y = 0$ (b) $y = 0, z = 0$ (c) $z = 0, x = 0$ (d) $x = 0, y = 0, z = 0$

Distance Between Two points

12. The perpendicular distance from the point $P(x, y, z)$ to xy -plane is (Easy)
- (a) x (b) y (c) z (d) $\sqrt{x^2 + y^2}$
13. The perpendicular distance from the point $P(6, 7, 8)$ to zx - plane is (Easy)
- (a) 8 (b) 7 (c) 6 (d) 10
14. From which of the following the distance of the point $(1, 2, 3)$ is $\sqrt{10}$ (Average)
- (a) Origin (b) x -axis (c) y -axis (d) z -axis
15. The perpendicular distance of the point $P(6, 7, 8)$ from XY -plane is (Easy) (KCET-2017)
- (a) 7 (b) 6 (c) 8 (d) 5
16. The distance of the point $P(a, b, c)$ from the x -axis is (Average) (KCET-2020)
- (a) $\sqrt{a^2 + b^2}$ (b) $\sqrt{b^2 + c^2}$ (c) a (d) $\sqrt{a^2 + c^2}$
17. The distance of the point $P(-3, 4, 5)$ from YZ -plane is (Average) (KCET-2025)
- (a) -3 units (b) 3 units (c) 4 units (d) 5 units
18. The point on x - axis which is equidistant from the point $A(3, 2, 2)$ & $B(5, 5, 4)$ (Average)
- (a) $(16, 0, 0)$ (b) $(\frac{5}{4}, 0, 0)$ (c) $(9, 0, 0)$ (d) $(\frac{49}{4}, 0, 0)$
19. Let $(3, 4, -1)$ & $(-1, 2, 3)$ be the end points of a diameter of a sphere. Then the radius of the sphere is equal to (Average)
- (a) 2 units (b) 3 units (c) 6 units (d) 7 units
20. The coordinates of a point on y -axis which are at a distance of $5\sqrt{2}$ from the point $P(3, -2, 5)$ is (Average)
- (a) $(0, 6, 0)$ or $(0, -2, 0)$ (b) $(0, -6, 0)$ or $(0, 2, 0)$
(c) $(0, 4, 0)$ or $(0, -4, 0)$ (d) $(0, 5, 0)$ or $(0, -5, 0)$
21. If the sum of the squares of the distances of a point from the three coordinate axes be 36, then its distance from the origin is (Average)
- (a) 6 (b) $3\sqrt{2}$ (c) $2\sqrt{3}$ (d) $\sqrt{6}$
22. If the points $(-1, 3, 2)$, $(-4, 2, -2)$ and $(5, 5, \lambda)$ are collinear, then $\lambda =$ (Easy)
- (a) -10 (b) 5 (c) -5 (d) 10
23. What is the length of foot of perpendicular drawn from the point $P(3, 4, 5)$ on y -axis? (Average)
- (a) $\sqrt{41}$ units (b) $\sqrt{34}$ units (c) 5 units (d) 4 units

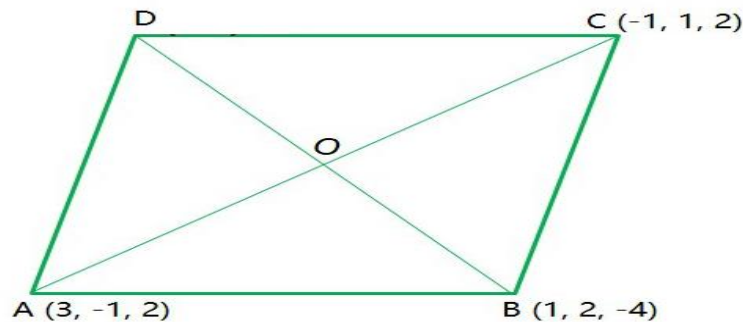
24. If the distance between the points $(a, 0, 1)$ and $(0, 1, 2)$ is $\sqrt{27}$, then the value of a is (Average)
- (a) 5 (b) ± 5 (c) -5 (d) 0
25. Reflection of the point (α, β, γ) in XY plane is (Difficult) (KCET-2017)
- (a) $(0, 0, \gamma)$ (b) $(\alpha, \beta, -\gamma)$ (c) $(-\alpha, -\beta, \gamma)$ (d) $(\alpha, \beta, -\gamma)$
26. Find the equation of the set of the points P such that its distances from the points $A(3, 4, -5)$ and $B(-2, 1, 4)$ are equal. (Average)
- (a) $10x + 6y - 18z - 29 = 0$ (b) $10x + 18y - 6z - 29 = 0$
 (c) $5x + 3y - 9z - 29 = 0$ (d) $10x + 6y - 18z - 45 = 0$
27. Find the coordinates of a point which is equidistant from the four points $O(0, 0, 0)$, $A(l, 0, 0)$, $B(0, m, 0)$ and $C(0, 0, n)$. (Difficult)
- (a) (l, m, n) (b) $(\frac{l}{2}, \frac{m}{2}, \frac{n}{2})$ (c) $(\frac{l}{2}, m, \frac{n}{2})$ (d) $(2l, 2m, 2n)$
28. The centroid of a triangle ABC is at the point $(1, 1, 1)$. If the coordinates of A and B are $(3, -5, 7)$ and $(-1, 7, -6)$, respectively, find the coordinates of the point C . (Average)
- (a) $(1, 1, 2)$ (b) $(3, 1, 2)$ (c) $(1, 2, 2)$ (d) $(1, -1, 2)$
29. A point moves so that the sum of its distances from the points $(4, 0, 0)$ and $(-4, 0, 0)$ remains 10. The locus of the point is (Difficult)
- (a) $9x^2 - 25y^2 + 25z^2 = 225$ (b) $9x^2 + 25y^2 - 25z^2 = 225$
 (c) $9x^2 + 25y^2 + 25z^2 = 225$ (d) $9x^2 + 25y^2 + 25z^2 + 225 = 0$
30. **Statement 1:** The perpendicular distance from the point $P(6, 7, 8)$ to zx - plane is 7
Statement 2: The shortest distance of the point (a, b, c) from the x -axis is $\sqrt{b^2 + c^2}$ (Difficult)
- A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1

31. Statement 1: A point is in XY plane. Its distance measured parallel to X axis is 10 units and that of parallel to Y axis is 20 units. Then its coordinates is (10,20,0).

Statement 2: The coordinates of any point in the *XZ-plane* is (0, b, c). **(Difficult)**

- a) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
- b) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
- c) STATEMENT 1 is true and STATEMENT 2 is false.
- d) STATEMENT 1 is false and STATEMENT 1 is true.

32. For the figure given below, consider the following statements 1 and 2 (Difficult)



Statement 1: The coordinates of point D is (1, -2, 8)

Statement 2: The length of diagonal is AB= 20

- a) Statement 1 is true and Statement 2 is false
- b) Statement 1 is false and Statement 2 is true
- c) Both Statement 1 and 2 are true
- d) Both Statement 1 and 2 are false.

33. The mid points of the sides of a triangle are (1, 5, -1), (0, 4, -2) and (2, 3, 4) then centroid of the triangle (Average)

- (a) (1, 4, 3)
- (b) $(1, 4, \frac{1}{3})$
- (c) (-1, 4, 3)
- (d) $(\frac{1}{3}, 2, 4)$

INTRODUCTION TO THREE DIMENSIONAL GEOMETRY

1	2	3	4	5	6	7	8	9	10
b	a	d	d	d	a	d	c	a	a
11	12	13	14	15	16	17	18	19	20
b	c	b	c	c	b	b	d	b	b
21	22	23	24	25	26	27	28	29	30
b	d	b	b	d	a	b	d	c	c
31	32	33							
c	a	b							