CLASS XI – MATHEMATICS (041)

CHAPTER 11 : INTRODUCTION TO THREE DIMENSIONAL GEOMETRY

PRACTICE PAPER (SESSION 2026–27)

Maximum Marks: 40 **Time Allowed: 1½ Hours**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 23 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions 1 to 12 are Multiple Choice Questions (MCQs) and Questions 13 and 14 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 15 to 18 are Very Short Answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Questions 19 to 21 are Short Answer (SA) type questions, carrying 3 marks each.
6. In Section D, Question 22 is a Long Answer (LA) type question, carrying 5 marks.
7. In Section E, Question 23 is a case study based question, carrying 4 marks.
8. There is no overall choice. However, an internal choice has been provided in 2 questions of Section B (Q17, Q18), 2 questions of Section C (Q20, Q21), in Q22 of Section D and in one sub-part of Q23 of Section E.
9. Draw neat and clean figures wherever required. Use of calculators is not allowed.

SECTION – A **(14 × 1 = 14)**

This section comprises of 12 multiple choice questions (Q1–Q12) and 2 assertion–reason based questions (Q13–Q14) of 1 mark each.

No.	Questions	Marks
Q1.	Fig. 1 shows a rectangular box with one vertex at the origin O. Its edges OA, OB and OC lie along the x-, y- and z-axes, with OA = 4, OB = 3 and OC = 5 units. The coordinates of the vertex E are	**1**

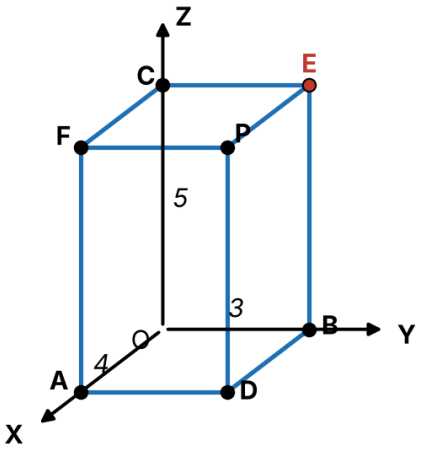


Fig. 1

(A) (3, 0, 5) (B) (0, 3, 5)

(C) (0, 5, 3) (D) (4, 3, 5)

Q2. In Fig. 2, the foot of the perpendicular from the point P to the XY-plane is M(3, –2, 0), and PM = 4 units with P above the XY-plane. The point P lies in the octant **1**

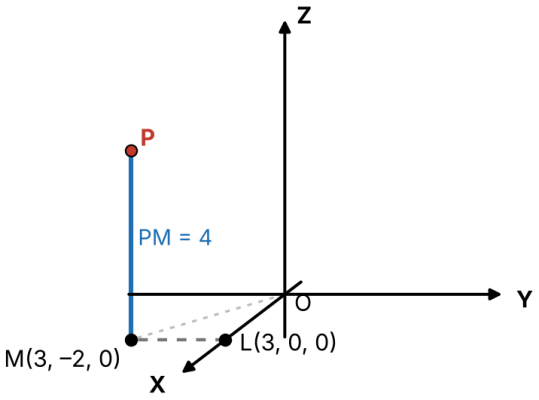


Fig. 2

(A) II (B) III

(C) IV (D) VI

Q3. The distance of the point (2, –3, 6) from the origin is **1**

(A) 5 (B) 11

(C) 49 (D) 7

Q4. The distance between the points (1, –2, 3) and (5, 2, 5) is **1**

(A) 6 (B) 5

(C) 4 (D) 7

Q5. The equation of the set of points which are equidistant from the points A(2, 0, –3) and B(–4, 2, 1) is **1**

(A) 3x + y – 2z + 2 = 0 (B) 3x – y – 2z + 2 = 0

(C) 3x – y + 2z – 2 = 0 (D) x – 3y + 2z + 2 = 0

Q6. The point on the y-axis which is equidistant from the points (2, 1, 3) and (–2, 5, –1) is **1**

(A) (0, 3, 0) (B) (0, 4, 0)

(C) (0, 2, 0) (D) (0, 1, 0)

Q7. The triangle with vertices O(0, 0, 0), A(3, 4, 0) and C(0, 0, 5) is **1**

(A) equilateral (B) scalene

(C) isosceles but not right-angled (D) right-angled and isosceles

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Q8. Fig. 3 shows a rectangular box (not drawn to scale) whose opposite corners are A(1, 2, –1) and B(5, 5, 11). The length of the diagonal AB is **1**

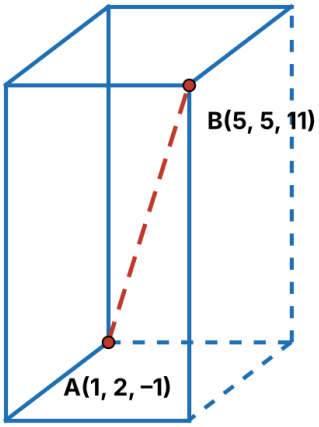


Fig. 3

(A) 13 (B) 12

(C) 14 (D) 15

Q9. A and B are the points (1, 0, 0) and (–1, 0, 0). The equation of the set of points P such that $PA^2 + PB^2 = 20$ is **1**

(A) $x^2 + y^2 + z^2 = 10$ (B) $x^2 + y^2 + z^2 = 9$

(C) $x^2 + y^2 + z^2 = 18$ (D) $x^2 + y^2 + z^2 = 20$

Q10. The centroid of the triangle with vertices A(1, 2, 3), B(–3, 4, 6) and C(5, 0, –3) is **1**

(A) (3, 6, 6) (B) (1, 3, 2)

(C) (1, 2, 2) (D) (–1, 2, 2)

Q11. The coordinates of the point on the z-axis at a distance of 5 units below the XY-plane are **1**

(A) (0, –5, 0) (B) (–5, 0, 0)

(C) (0, 0, 5) (D) (0, 0, –5)

Q12. The perpendicular distances of the point (–4, 5, –3) from the YZ-plane, the ZX-plane and the XY-plane are respectively **1**

(A) 4, 5, 3 (B) –4, 5, –3

(C) 5, 4, 3 (D) 3, 4, 5

Assertion–Reason Based Questions

Directions: Question numbers 13 and 14 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

Q13. **Assertion (A):** Every point on the y-axis is of the form (0, y, 0). **1**
Reason (R): The three coordinate planes divide the space into eight octants.

Q14. **Assertion (A):** The points A(0, 0, 0), B(1, 2, 2) and C(3, 6, 6) are collinear. **1**
Reason (R): Three points P, Q and R are collinear if $PQ^2 + QR^2 = PR^2$.

SECTION – B (4 × 2 = 8)

This section comprises of 4 very short answer (VSA) type questions of 2 marks each.

Q15. Fig. 4 shows a triangle ABC whose vertices lie on the coordinate axes: A(2, 0, 0), B(0, 2, 0) and C(0, 0, 2). **2**

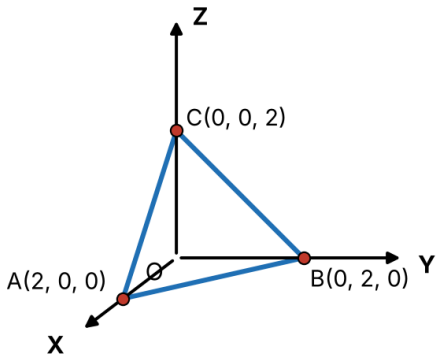


Fig. 4

(i) Find the lengths of the sides AB, BC and CA. **[1]**

(ii) Hence state what kind of triangle ABC is. **[1]**

Q16. Find the distance between the points P(2, –3, 1) and Q(–2, 1, 8). **2**

Q17. **(A)** Show that the points A(0, 1, –1), B(2, 3, 1) and C(4, 5, 3) are collinear. **2**

OR

(B) Find the coordinates of the point on the x-axis which is equidistant from the points A(–1, 2, 2) and B(4, 2, 3).

Q18. **(A)** Find the equation of the set of points P(x, y, z) which are equidistant from the points A(1, 0, –2) and B(3, 4, 0). **2**

OR

(B) The centroid of a triangle ABC is at G(1, 2, 0). If A and B are the points (2, 3, –1) and (–4, 5, 3), find the coordinates of C.

SECTION – C (3 × 3 = 9)

This section comprises of 3 short answer (SA) type questions of 3 marks each.

Q19. Fig. 5 shows a quadrilateral ABCD with vertices A(1, 1, 0), B(3, 3, 1), C(3, 6, 5) and D(1, 4, 4) in space. **3**

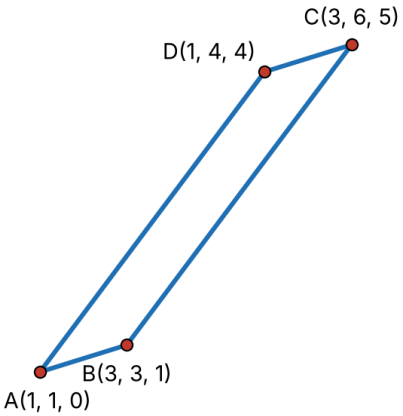


Fig. 5

(i) Find the lengths of the four sides AB, BC, CD and DA. **[1]**

(ii) Hence show that ABCD is a parallelogram. **[1]**

(iii) Find the lengths of the diagonals AC and BD and show that ABCD is not a rectangle. **[1]**

Q20. **(A)** Show that the points A(0, 1, –1), B(2, 3, 0) and C(2, 0, –3) are the vertices of a right-angled isosceles triangle. **3**

OR

(B) If A and B are the points (2, 1, –3) and (0, 3, 1), find the equation of the set of points P such that $PA^2 + PB^2 = 30$.

Q21. **(A)** The triangle with vertices P(2a, 3, –5), Q(1, b – 4, 7) and R(–5, 6, 2c) has its centroid at (0, 1, 2). Find the values of a, b and c. **3**

OR

(B) Find the values of x for which the distance between the points P(x, 2, 3) and Q(1, –2, 7) is 9 units.

SECTION – D (1 × 5 = 5)

This section comprises of 1 long answer (LA) type question of 5 marks.

Q22. **(A)** A point P(x, y, z) moves so that its distance from O(0, 0, 0) is twice its distance from B(3, 0, 0). Find the equation of the locus of P and verify that the points (2, 0, 0) and (6, 0, 0) lie on it. **5**

OR

(B) Show that the points A(1, 0, –1), B(3, 2, 0), C(4, 0, 2) and D(2, –2, 1) are the vertices of a square. **[5]**

SECTION – E (1 × 4 = 4)

This section comprises of 1 case study based question of 4 marks with sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.

Q23. **Case Study:** A rectangular hall is 12 m long, 9 m wide and 8 m high. A corner O of the floor is taken as the origin, with the x-axis along the length, the y-axis along the width and the z-axis along the height, as shown in Fig. 6. A lamp hangs from the ceiling at L(4, 3, 8) and a wall socket is fixed at W(6, 6, 2). **4**

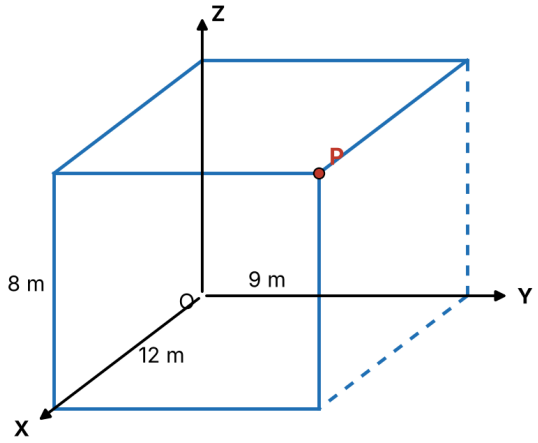


Fig. 6

Based on the given information, answer the following questions:

(i) Write the coordinates of the corner P of the ceiling which is opposite to O in Fig. 6. **[1]**

(ii) Find the distance of the corner P from the origin O. **[1]**

(iii) **(a)** Find the length of the straight wire needed to join the lamp L to the socket W. **[2]**

OR

(b) Find the equation of the set of points which are equidistant from the corner O and the corner P. **[2]**

— End of Question Paper —