

Introduction to Three Dimensional Geometry — CBSE Pattern Test 2

Class 11 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

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General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.
 (2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.
 (3) For MCQ questions choose the single correct option; for VSA answers write a single line.
 (4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

1. A point on the x-axis has coordinates of the form
 - (A) $(x, 0, 0)$
 - (B) $(0, y, 0)$
 - (C) $(0, 0, z)$
 - (D) $(x, y, 0)$
2. The distance of the point $(3, 4, 12)$ from the origin is
 - (A) 13
 - (B) 19
 - (C) 25
 - (D) 7
3. The distance of the point (x, y, z) from the y-axis is
 - (A) $\sqrt{x^2 + z^2}$
 - (B) $\sqrt{x^2 + y^2}$
 - (C) $\sqrt{y^2 + z^2}$
 - (D) $|y|$
4. The centroid of a triangle with vertices (x_1, y_1, z_1) , (x_2, y_2, z_2) , (x_3, y_3, z_3) is
 - (A) $((x_1+x_2+x_3)/3, (y_1+y_2+y_3)/3, (z_1+z_2+z_3)/3)$
 - (B) $((x_1+x_2)/2, (y_1+y_2)/2, (z_1+z_2)/2)$
 - (C) $(x_1+x_2+x_3, y_1+y_2+y_3, z_1+z_2+z_3)$
 - (D) $(0, 0, 0)$
5. Direction ratios of a line are proportional to
 - (A) its direction cosines
 - (B) its length
 - (C) the origin
 - (D) the coordinate axes
6. Two lines are parallel if their direction ratios are
 - (A) proportional
 - (B) equal to zero
 - (C) perpendicular
 - (D) reciprocal
7. The angle between the x-axis and the y-axis is
 - (A) 90°

- (B) 0°
 (C) 45°
 (D) 180°
8. The points $(1, 0, 0)$, $(2, 1, 1)$ and $(3, 2, 2)$ are
 (A) collinear
 (B) not collinear
 (C) vertices of a triangle
 (D) coincident
9. Write the relation between the direction cosines of a line.
10. Write the condition for two lines to be parallel using direction ratios.

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. Find the distance between $(1, 2, 3)$ and $(1, 2, 6)$.
12. Find the centroid of the triangle with vertices $(1, 0, 0)$, $(0, 1, 0)$ and $(0, 0, 1)$.
13. Write the direction cosines of the x-axis.
14. Write the condition for two lines to be perpendicular using direction cosines.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Find the distance of the point $(4, 3, 5)$ from the y-axis.
16. Find the coordinates of the point dividing the join of $(1, 2, 3)$ and $(3, 6, 9)$ internally in the ratio $1 : 2$.
17. Show that the lines with direction ratios $(2, 3, -1)$ and $(1, -1, -1)$ are perpendicular.
18. Show that the points $A(1, 2, 3)$, $B(3, 4, 5)$ and $C(5, 6, 7)$ are collinear.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Find the point on the y-axis which is equidistant from the points $(2, 3, 4)$ and $(4, 1, 5)$.
20. Find the angle between the line joining the points $(1, 2, 3)$, $(2, 3, 4)$ and the line joining $(0, 0, 0)$, $(3, 3, 3)$.

Answer Key (Marking Scheme)

- Q1 — (A) $(x, 0, 0)$. Q2 — (A) 13. Q3 — (A) $\sqrt{(x^2 + z^2)}$. Q4 — (A) $((x_1+x_2+x_3)/3, (y_1+y_2+y_3)/3, (z_1+z_2+z_3)/3)$.
- Q5 — (A) its direction cosines. Q6 — (A) proportional. Q7 — (A) 90° . Q8 — (A) collinear.
- Q9 — $l^2 + m^2 + n^2 = 1$.
- Q10 — Direction ratios are proportional.
- Q11 — 3.
- Q12 — $(1/3, 1/3, 1/3)$.
- Q13 — $(1, 0, 0)$.
- Q14 — $l_1l_2 + m_1m_2 + n_1n_2 = 0$.
- Q15 — $\sqrt{41}$.
- Q16 — $(5/3, 10/3, 5)$.
- Q17 — Dot product $2 - 3 + 1 = 0$.
- Q18 — $AB = (2, 2, 2)$, $BC = (2, 2, 2)$.
- Q19 — $(0, 3, 0)$.

Q20 — 0°.