Coordinate System and Coordinates Exercise 1 :
Single Option Correct Type Questions

▪ This section contains **15 multiple choice questions.** Each question has four choices (a), (b), (c), (d) out of which **ONLY ONE** is correct.

1. Vertices of a variable triangle are $(3, 4)$, $(5\cos\theta, 5\sin\theta)$ and $(5\sin\theta, -5\cos\theta)$, where $\theta \in R$. Locus of its orthocentre is

(a) $x^2 + y^2 + 6x + 8y - 25 = 0$

(b) $x^2 + y^2 - 6x + 8y - 25 = 0$

(c) $x^2 + y^2 + 6x - 8y - 25 = 0$

(d) $x^2 + y^2 - 6x - 8y - 25 = 0$

2. If a rod AB of length 2 units slides on coordinate axes in the first quadrant. An equilateral triangle ABC is completed with C on the side away from O. Then, locus of C is

(a) $x^2 + y^2 - xy + 1 = 0$

(b) $x^2 + y^2 - xy\sqrt{3} + 1 = 0$

(c) $x^2 + y^2 + xy\sqrt{3} - 1 = 0$

(d) $x^2 + y^2 - xy\sqrt{3} - 1 = 0$

3. The sides of a triangle are $3x + 4y$, $4x + 3y$ and $5x + 5y$ units, where $x > 0, y > 0$. The triangle is

(a) right angled (b) acute angled

(c) obtuse angled (d) isosceles

4. Let P and Q be the points on the line joining $A(-2, 5)$ and $B(3, 1)$ such that $AP = PQ = QB$. Then, the mid-point of PQ is

(a) $\left(\frac{1}{2}, 3\right)$ (b) $\left(-\frac{1}{4}, 4\right)$

(c) $(2, 3)$ (d) $(-1, 4)$

5. A triangle ABC right angled at A has points A and B as $(2, 3)$ and $(0, -1)$ respectively. If $BC = 5$ units, then the point C is

(a) $(4, 2)$ (b) $(-4, 2)$

(c) $(-4, 4)$ (d) $(4, -4)$

6. The locus of a point P which divides the line joining $(1, 0)$ and $(2\cos\theta, 2\sin\theta)$ internally in the ratio $2:3$ for all θ is

(a) a straight line (b) a circle

(c) a pair of straight lines (d) a parabola

7. The points with the coordinates $(2a, 3a)$, $(3b, 2b)$ and (c, c) are collinear

(a) for no value of a, b, c (b) for all values of a, b, c

(c) if $a, \frac{c}{5}, b$ are in HP (d) if $a, \frac{2c}{5}, b$ are in HP

8. The vertices of a triangle are $(0, 3)$, $(-3, 0)$ and $(3, 0)$. The coordinates of its orthocentre are

(a) $(0, -2)$ (b) $(0, 2)$

(c) $(0, 3)$ (d) $(0, -3)$

9. ABC is an equilateral triangle such that the vertices B and C lie on two parallel lines at a distance 6. If A lies between the parallel lines at a distance 4 from one of them, then the length of a side of the equilateral triangle is

(a) 8 (b) $\sqrt{\frac{88}{3}}$

(c) $\frac{4\sqrt{7}}{\sqrt{3}}$ (d) None of these

10. A, B, C are respectively the points $(1, 2)$, $(4, 2)$, $(4, 5)$. If T_1, T_2 are the points of trisection of the line segment AC and S_1, S_2 are the points of trisection of the line segment BC, the area of the quadrilateral $T_1S_1S_2T_2$ is

(a) 1 (b) $\frac{3}{2}$ (c) 2 (d) $\frac{5}{2}$

11. (i) The points $(-1, 0)$, $(4, -2)$ and $(\cos 2\theta, \sin 2\theta)$ are collinear

(ii) The points $(-1, 0)$, $(4, -2)$ and $\left(\frac{1-\tan^2\theta}{1+\tan^2\theta}, \frac{2\tan\theta}{1+\tan^2\theta}\right)$ are collinear

(a) both statements are equivalent

(b) statemetn (i) has more solution than statement (ii) for θ

(c) statement (ii) has more solution than statement (i) for θ

(d) None of the above

12. If $\alpha_1, \alpha_2, \alpha_3, \beta_1, \beta_2, \beta_3$ are the values of n for which $\sum_{r=0}^{n-1} x^{2r}$ is divisible by $\sum_{r=0}^{n-1} x^r$, then the triangle having vertices (α_1, β_1), (α_2, β_2) and (α_3, β_3) cannot be

(a) an isosceles triangle

(b) a right angled isosceles triangle

(c) a right angled triangle

(d) an equilateral triangle

13. A triangle ABC with vertices $A(-1, 0)$, $B\left(-2, \frac{3}{4}\right)$ and $C\left(-3, -\frac{7}{6}\right)$ has its orthocentre at H. Then, the orthocentre of triangle BCH will be

(a) $(-3, -2)$ (b) $(1, 3)$

(c) $(-1, 2)$ (d) None of these