CLASS XI – MATHEMATICS (041)
CHAPTER 10 : CONIC SECTIONS
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 circle with centre C(3, –1) passing through the point P(7, 2). The equation of the circle is	**1**

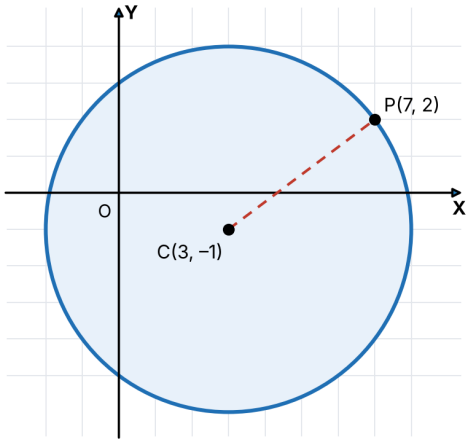


Fig. 1

(A) $(x - 3)^2 + (y + 1)^2 = 5$ (B) $(x + 3)^2 + (y - 1)^2 = 25$

(C) $(x - 3)^2 + (y + 1)^2 = 25$ (D) $x^2 + y^2 = 25$

Q2. Fig. 2 shows an ellipse with centre at the origin. The ends of its major axis are A(–5, 0), B(5, 0) and the ends of its minor axis are C(0, 3), D(0, –3). The eccentricity of the ellipse is **1**

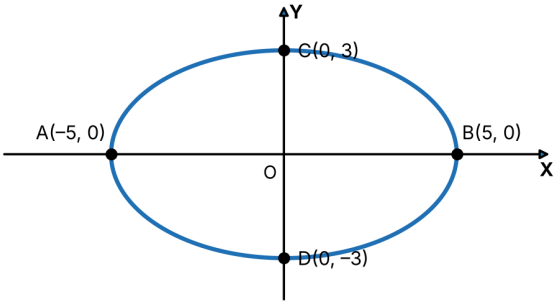


Fig. 2

(A) 3/5 (B) 4/5

(C) 5/4 (D) 4/3

Q3. The centre and the radius of the circle $x^2 + y^2 – 6x + 4y – 3 = 0$ are respectively **1**

(A) (–3, 2) and 4 (B) (3, –2) and 16

(C) (–3, 2) and 16 (D) (3, –2) and 4

Q4. The coordinates of the focus and the equation of the directrix of the parabola $x^2 = –12y$ are **1**

(A) (0, –3) and y = 3 (B) (0, 3) and y = –3

(C) (–3, 0) and x = 3 (D) (3, 0) and x = –3

Q5. The length of the latus rectum of the ellipse $16x^2 + 25y^2 = 400$ is **1**

(A) 8/5 (B) 16/5

(C) 32/5 (D) 64/5

Q6. The eccentricity of the hyperbola $x^2/144 – y^2/25 = 1$ is **1**

(A) 5/12 (B) 12/13

(C) 13/5 (D) 13/12

Q7. The equation of the ellipse with vertices (0, ±10) and foci (0, ±6) is **1**

(A) $x^2/100 + y^2/64 = 1$ (B) $x^2/64 + y^2/100 = 1$

(C) $x^2/100 + y^2/36 = 1$ (D) $x^2/36 + y^2/100 = 1$

Q8. Fig. 3 shows a parabola with its vertex at the origin and axis along the y-axis. It passes through the point P(4, 4). The coordinates of its focus are **1**

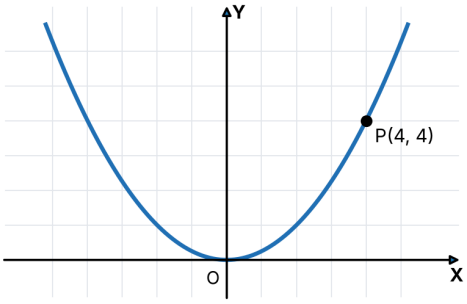


Fig. 3

(A) (1, 0) (B) (0, 4)

(C) (0, 1) (D) (4, 0)

Q9. A plane which does not pass through the vertex cuts both the nappes of a double-napped right circular cone. The section obtained is **1**

(A) a hyperbola (B) a parabola

(C) an ellipse (D) a circle

Q10. The line segment joining A(–1, 2) and B(5, –6) is a diameter of a circle. The equation of the circle is **1**

(A) $(x + 2)^2 + (y - 2)^2 = 25$ (B) $(x - 2)^2 + (y + 2)^2 = 100$

(C) $(x - 2)^2 + (y + 2)^2 = 10$ (D) $(x - 2)^2 + (y + 2)^2 = 25$

Q11. The parabola $y^2 = 4ax$ passes through the point (3, –6). The length of its latus rectum is **1**

(A) 12 (B) 6

(C) 3 (D) 9

Q12. The length of the transverse axis of the hyperbola $9x^2 - 16y^2 = 144$ is **1**

(A) 4 (B) 8

(C) 6 (D) 10

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):** The eccentricity of an ellipse is greater than 1. **1**
Reason (R): For an ellipse, $c^2 = a^2 - b^2 < a^2$, so that $e = c/a$ lies between 0 and 1.

Q14. **Assertion (A):** The parabola $y^2 = -8x$ opens to the left. **1**
Reason (R): In the standard equation $y^2 = -4ax$ ($a > 0$) the coefficient of x is negative, so the parabola lies on the left of the y-axis.

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 hyperbola with centre at the origin. Its vertices are (±5, 0) and its foci are $F_1(-13, 0)$ and $F_2(13, 0)$. **2**

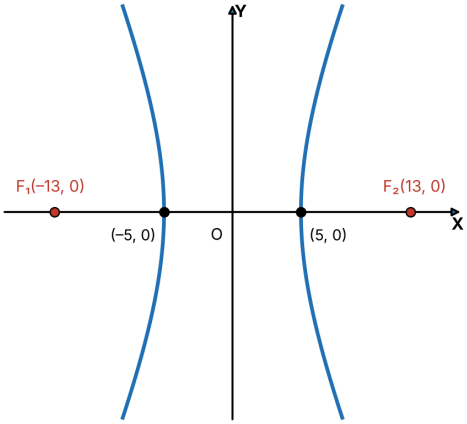


Fig. 4

(i) Find the equation of the hyperbola. **[1]**

(ii) Find its eccentricity and the length of its latus rectum. **[1]**

Q16. Find the centre and the radius of the circle $x^2 + y^2 + 6x - 8y - 11 = 0$. **2**

Q17. **(A)** Find the coordinates of the focus, the equation of the directrix and the length of the latus rectum of the parabola $x^2 = 20y$. **2**

OR

(B) Find the equation of the parabola which has its vertex at the origin, is symmetric about the y-axis and passes through the point (4, –2).

Q18. **(A)** Find the equation of the ellipse with centre at the origin, foci (±3, 0) and the length of the minor axis 8. **2**

OR

(B) Find the equation of the hyperbola with vertices (0, ±4) and foci (0, ±6).

SECTION – C (3 × 3 = 9)

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

Q19. A tunnel has a semi-elliptical cross-section, 16 m wide at the base and 4 m high at the centre, as shown in Fig. 5. Take the centre O of the base as the origin, the base along the x-axis and the vertical through O as the y-axis. **3**

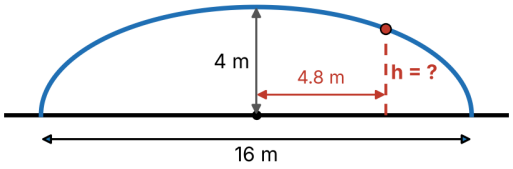


Fig. 5

(i) Write the equation of the ellipse of which the tunnel is a part. **[1]**

(ii) Find the height h of the tunnel at a point 4.8 m from the centre O. **[1]**

(iii) At what distance from the centre is the height of the tunnel $2\sqrt{3}$ m? **[1]**

Q20. **(A)** Find the equation of the ellipse whose major axis is along the x-axis, with centre at the origin, and which passes through the points (0, 2) and (2, √3). **3**

OR

(B) Find the coordinates of the foci, the eccentricity and the length of the latus rectum of the ellipse $4x^2 + y^2 = 36$.

Q21. **(A)** Find the equation of the circle which passes through the points (4, 0) and (0, 2) and whose centre lies on the line x – y = 0. **3**

OR

(B) Find the equation of the hyperbola with foci (±3, 0) and the length of the latus rectum 16.

SECTION – D (1 × 5 = 5)

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

Q22. **(A)** A rod AB of length 10 cm moves with its end A on the x-axis and its end B on the y-axis. A point P(x, y) on the rod is such that AP = 4 cm. Show that the locus of P is an ellipse and find its equation. **5**

OR

(B) An arch is in the form of a parabola with its axis vertical. Its span is 24 m and its height is 9 m. (i) Taking the vertex (the crown of the arch) as origin, find the equation of the parabola. **[3]** (ii) Find the width of the arch at a point 4 m below the crown. **[2]**

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:** The cable of a suspension bridge hangs in the form of a parabola between two towers 60 m apart. Each tower top is 9 m above the lowest point V of the cable, and V is 4 m above the road. Take V as the origin, the horizontal through V as the x-axis and the vertical through V as the y-axis (Fig. 6). The cable is supported by vertical hangers. **4**

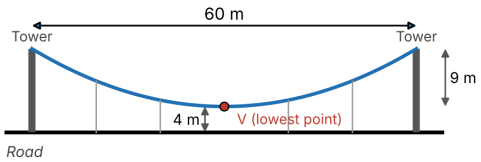


Fig. 6

Based on the given information, answer the following questions:

(i) Find the equation of the parabola formed by the cable. **[1]**

(ii) Find the length of the vertical hanger at a point 20 m from the middle of the bridge. **[1]**

(iii) **(a)** At what horizontal distance from the middle of the bridge is the cable 6.25 m above V? **[2]**

OR

(b) Find the coordinates of the focus, the equation of the directrix and the length of the latus rectum of the parabola. **[2]**

— End of Question Paper —