# PARABOLA



**SINGLE CORRECT OPTION TYPE**

1. The locus of the foot of the perpendicular drawn from the vertex on any tangent to the parabola $y^2 = 4ax$ is
(A) $x^3 + xy^2 + ay^2 = 0$ (B) $y^3 + x^2y + ax^2 = 0$ (C) $x^2 - xy^2 - ay^2 = 0$ (D) $y^3 - x^2y - ax^2 = 0$

2. If one end of the focal chord of the parabola $y^2 = 4x$ is (4, 4), then the other end is
(A) $\left(\frac{1}{4}, -1\right)$ (B) $\left(\frac{1}{4}, 1\right)$ (C) (1, 2) (D) (1, -2)

3. A double ordinate of the parabola $y^2 = 4ax$ is 8a. The lines from the vertex to its ends are inclined at
(A) 30° (B) 45° (C) 60° (D) 90°

4. The length of the latus rectum of the parabola $3y^2 + 6y + 8x - 5 = 0$ is
(A) 8/3 (B) 3/8 (C) 3 (D) 8

5. The vertex of the parabola $x^2 + 8x + 12y + 4 = 0$ is
(A) (-4, 1) (B) (4, -1) (C) (-4, -1) (D) (4, 1)

6. The point on the curve $y^2 = x$, the tangent at which makes an angle 45° with x-axis will be given by
(A) (1/2, 1/4) (B) (1/2, 1/2) (C) (2, 4) (D) (1/4, 1/2)

7. If (2, 0) is the vertex and y-axis, the directrix of a parabola, then its focus is
(A) (2, 0) (B) (-2, 0) (C) (4, 0) (D) (-4, 0)

8. The angle between the tangents drawn from the origin to the parabola $(x - a)^2 = -4a(y + a)$, is
(A) $\tan^{-1}(1/3)$ (B) $\pi/3$ (C) $\pi/2$ (D) none of these

9. The line $x \cos \alpha + y \sin \alpha = p$ touches the parabola $x^2 = -4ay$, if
(A) $a = p \sec \alpha$ (B) $a + p \cos \alpha = 0$
(C) $a^2 \cos \alpha + p^2 \sin \alpha = 0$ (D) $a = p \sin \alpha$

10. PQ is any focal chord of a parabola. The angle $\theta$ between the tangent drawn at P and normal at Q is
(A) 0 (B) $\pi/4$ (C) $\pi/3$ (D) none of these

11. The general system of parallel chords of the parabola $y^2 = 4x$ is $y = x + k$. the equation of the corresponding diameter is
(A) $x - y = 2a$ (B) $x + y = a$ (C) $y = 2a$ (D) $x = a$

12. If the line $4y - 3x - 8 = 0$ cuts the parabola $x^2 + y - 4 = 0$ at A and B, then PA.PB is equal to where $P \equiv (0, 2)$, is
(A) 3 (B) 25/8 (C) $\sqrt{2}$ (D) $13/\sqrt{5}$

13. A circle with its centre at the focus of the parabola $y^2 = 4ax$ and touching its directrix into the parabola at points A, B. Then length AB is equal to
(A) 4a (B) 2a (C) a/2 (D) None of these

14. The coordinates of the point on the parabola $x^2 = 4y$ which is nearest to the circle $(x - 3)^2 + y^2 = 1$, are
(A) (0, 0) (B) (-2, 1) (C) (2, 1) (D) (-4, 4)

15. If the normal to the parabola $y^2 = 4ax$ at point $t_1$ cuts the parabola again at point $t_2$, then
(A) $2 \le t_2^2 \le 8$ (B) $t_2^2 \le 2$ (C) $t_2^2 \ge 8$ (D) none of these

16. The chord x + y = 1 cuts the parabola $y^2 = 4ax$ in points A, B. The normals at A and B intersect at C. A third line from C cuts the parabola normally at D whose coordinates are
(A) (a, -2a) (B) (4a, 4a) (C) (0, 0) (D) none of these

17. The triangle formed by the tangent to the parabola $y^2 = 4x$ at the point whose abscissa lies in the interval $[a^2, 4a^2]$, the ordinate and the X-axis, has greatest area equal to
(A) $12a^3$ (B) $8a^3$ (C) $16a^3$ (D) none of these

18. The parabolas $y = x^2 – 9$ and $y = kx^2$ intersect at points A and B. If length AB is equal to 2a, then the value of k is
(A) $\frac{a^2-9}{a^2}$ (B) $9/a^2$ (C) $a^2 + 3$ (D) none of these

19. If the tangents are points A, B on a parabola meet in T, then the focal distances of the points SA, ST and SB are in
(A) A.P. (B) G.P. (C) H.P. (D) none of these

20. If the normals from any point to the parabola $x^2 = 4ay$ cuts the line y = 2 in points whose abscissa are in A.P., then slopes of tangents at the three co-normal points are in
(A) A.P. (B) G.P. (C) H.P. (D) None

**NUMERICAL BASED**

21. A trapezium is inscribed in the parabola $y^2 = 4x$ such that its diagonal pass through the point $(1,0)$ and each has length $\frac{25}{4}$. If the area of trapezium be $P$ then $4P$ is equal to $15k$ then $k =$

22. Three normals drawn from any point to the parabola $y^2 = 4ax$ cut the line $x = 2a$ in points whose ordinates are in arithmetic progression. If the slopes of the normals be $m_1, m_2$ and $m_3$ then $\left(\frac{m_1}{m_2}\right)\left(\frac{m_3}{m_2}\right)$ is equal to

23. Let the maximum and minimum values of the areas of the triangles formed by x-axis, tangent and normal at a point on the segment of parabola $y = x^2 + 1, 1 \le x \le 3$ be $A_1$ and $A_2$ respectively then $3A_1 + A_2$ is equal to $\lambda$ then Integral part of $\frac{\lambda}{100} =$

24. Normal at P to the parabola $(12x+5y+3)^2 = 52(5x-12y+1)$ meets the line $12x+5y+3=0$ at G perpendicular GN is drawn to SP ($S =$ focus) then $NP =$

25. Area of a triangle formed by the tangents drawn from a point $(-2,2)$ to the parabola $y^2 = 4(x+y)$ and their corresponding chord of contact is

**KEY**

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|---|---|---|---|---|---|---|---|---|---|
| **1.** | A | **2.** | A | **3.** | D | **4.** | A | **5.** | A |
| **6.** | D | **7.** | C | **8.** | C | **9.** | D | **10.** | A |
| **11.** | C | **12.** | B | **13.** | A | **14.** | C | **15.** | C |
| **16.** | B | **17.** | C | **18.** | A | **19.** | B | **20.** | B |
| **21.** | 5 | **22.** | 1 | **23.** | 9 | **24.** | 2 | **25.** | 4 |

✻ *Wish You all the Best* ✻