DPP - Daily Practice Problems

Chapter-wise Sheets

MATHEMATICS CM11

SYLLABUS : Conic Sections

Max. Marks : 120   **Marking Scheme :** (+4) for correct & (–1) for incorrect answer   **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. If from any point P, tangents PT, PT′ are drawn to two given circles with centres A and B respectively; and if PN is the perpendicular from P on their radical axis, then $PT^2 - PT'^2 =$
   (a) PN.AB
   (b) 2PN.AB
   (c) 4PN.AB
   (d) None of these

2. The parametric form of equation of the circle $x^2 + y^2 - 6x + 2y - 28 = 0$ is
   (a) $x = -3 + \sqrt{38}\cos\theta, y = -1 + \sqrt{38}\sin\theta$
   (b) $x = \sqrt{28}\cos\theta, y = \sqrt{28}\sin\theta$
   (c) $x = -3 - \sqrt{38}\cos\theta, y = 1 + \sqrt{38}\sin\theta$
   (d) $x = 3 + \sqrt{38}\cos\theta, y = -1 + \sqrt{38}\sin\theta$

3. A line meets the co-ordinate axes in A and B. A circle is, circumscribed about the triangle OAB. If the distances from A and B of the tangent to the circle at the origin be m and n, then the diameter of the circle is
   (a) m(m+n)
   (b) m+n
   (c) $\sqrt{mn}$
   (d) $\sqrt{m^2 + n^2}$

4. The angle between the tangents drawn from the origin to the parabola $y^2 = 4a(x - a)$ is
   (a) 90°
   (b) 30°
   (c) $\tan^{-1}\frac{1}{2}$
   (d) 45°

RESPONSE GRID   1. ⓐⓑⓒⓓ   2. ⓐⓑⓒⓓ   3. ⓐⓑⓒⓓ   4. ⓐⓑⓒⓓ

Space for Rough Work

5. The distance between the foci of an ellipse is 10 and its latus rectum is 15. Its equation referred to its axes as axes of coordinates is
(a) $3x^2 + 4y^2 = 300$ (b) $2x^2 + y^2 = 50$
(c) $10x^2 + 15y^2 = 300$ (d) None of these

6. Two points P and Q are taken on the line joining the points $A(0, 0)$ and $B(3a, 0)$ such that $AP = PQ = QB$. Circles are drawn on AP, PQ and QB as diameters. The locus of the point S, the sum of the squares of the tangents from which to the three circles is equal to b^2, is

(a) $x^2 + y^2 - 3ax + 2a^2 - b^2 = 0$

(b) $3(x^2 + y^2) - 9ax + 8a^2 - b^2 = 0$

(c) $x^2 + y^2 - 5ax + 6a^2 - b^2 = 0$

(d) $x^2 + y^2 - ax - b^2 = 0$

7. The coordinates of the middle point of the chord which the circle $x^2 + y^2 + 4x - 2y - 3 = 0$ cuts off on the line $y = x + 2$, are

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

(c) $\left(\dfrac{-3}{2}, \dfrac{-1}{2}\right)$ (d) $\left(\dfrac{3}{2}, \dfrac{-1}{2}\right)$

8. A hyperbola having the transverse axis of length $2\sin\theta$, is confocal with the ellipse $3x^2 + 4y^2 = 12$. Then its equation is
(a) $x^2 \csc^2\theta - y^2 \sec^2\theta = 1$
(b) $x^2 \sec^2\theta - y^2 \csc^2\theta = 1$
(c) $x^2 \sin^2\theta - y^2 \cos^2\theta = 1$
(d) $x^2 \cos^2\theta - y^2 \sin^2\theta = 1$

9. If three points E, F, G are taken on the parabola $y^2 = 4ax$ so that their ordinates are in G.P., then the tangents at E and G intersect on the
(a) directrix   (b) axis
(c) ordinate of F   (d) tangent at F

10. AB is a focal chord of $x^2 - 2x + y - 2 = 0$ whose focus is S. If $AS = l_1$. then BS is equal to

(a) l_1 (b) $\dfrac{4l_1}{4l_1 - 1}$

(c) $\dfrac{l_1}{4l_1 - 1}$ (d) $\dfrac{2l_1}{4l_1 - 1}$

11. The point $([P + 1], [P])$ (where $[x]$ is the greatest integer less than or equal to x), lying inside the region bounded by the circle $x^2 + y^2 - 2x - 15 = 0$ and $x^2 + y^2 - 2x - 7 = 0$, then
(a) $P \in [-1, 0) \cup [0, 1) \cup [1, 2)$
(b) $P \in [-1, 2) - \{0, 1\}$
(c) $P \in (-1, 2)$
(d) None of these

12. A line is drawn through the point $P(3, 11)$ to cut the circle $x^2 + y^2 = 9$ at A and B. Then $PA \cdot PB$ is equal to
(a) 9   (b) 121
(c) 205   (d) 139

13. Let $z = 1 - t + i\sqrt{t^2 + t + 2}$, where t is a real parameter. The locus of z in the argand plane is
(a) an ellipse   (b) hyperbola
(c) a straight line   (d) None of these

14. The conic represented by the equation $\sqrt{ax} + \sqrt{by} = 1$ is
(a) ellipse   (b) hyperbola
(c) parabola   (d) None of these

| **RESPONSE** | **5.** ⓐⓑⓒⓓ | **6.** ⓐⓑⓒⓓ | **7.** ⓐⓑⓒⓓ | **8.** ⓐⓑⓒⓓ | **9.** ⓐⓑⓒⓓ |
| **GRID** | **10.** ⓐⓑⓒⓓ | **11.** ⓐⓑⓒⓓ | **12.** ⓐⓑⓒⓓ | **13.** ⓐⓑⓒⓓ | **14.** ⓐⓑⓒⓓ |

15. What is the area of the greatest rectangle that can be inscribed in the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$?

(a) ab (b) $2\,ab$

(c) $ab/2$ (d) $\sqrt{ab}$

16. The line $3x + 2y + 1 = 0$ meets the hyperbola $4x^2 - y^2 = 4a^2$ in the points P and Q. The coordinates of the point of intersection of the tangents at P and Q are

(a) $(-3a^2,\, 8a^2)$ (b) $(3a^2,\, 8a^2)$

(c) $(3a^2,\, -8a^2)$ (d) None of these

17. The lengths of the tangent drawn from any point on the circle $15x^2 + 15y^2 - 48x + 64y = 0$ to the two circles $5x^2 + 5y^2 - 24x + 32y + 75 = 0$ and $5x^2 + 5y^2 - 48x + 64y + 300 = 0$ are in the ratio of

(a) $1:2$ (b) $2:3$

(c) $3:4$ (d) None of these

18. The equation of the parabola whose focus is $(0, 0)$ and the tangent at the vertex is $x - y + 1 = 0$ is

(a) $x^2 + y^2 + 2xy - 4x + 4y - 4 = 0$

(b) $x^2 - 4x + 4y - 4 = 0$

(c) $y^2 - 4x + 4y - 4 = 0$

(d) $2x^2 + 2y^2 - 4xy - x + y - 4 = 0$

19. The curve described parametrically by $x = 2 - 3\sec t$, $y = 1 + 4\tan t$ represents :

(a) An ellipse centred at $(2, 1)$ and of eccentricity $\dfrac{3}{5}$

(b) A circle centred at $(2, 1)$ and of radius 5 units

(c) A hyperbola centred at $(2, 1)$ & of eccentricity $\dfrac{8}{5}$

(d) A hyperbola centred at $(2, 1)$ & of eccentricity $\dfrac{5}{3}$

20. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = 4$ orthogonally, then the locus of its centre is

(a) $2ax - 2by - (a^2 + b^2 + 4) = 0$

(b) $2ax + 2by - (a^2 + b^2 + 4) = 0$

(c) $2ax - 2by + (a^2 + b^2 + 4) = 0$

(d) $2ax + 2by + (a^2 + b^2 + 4) = 0$

21. If a variable point P on an ellipse of eccentricity e is joined to the foci S_1 and S_2 then the incentre of the triangle PS_1S_2 lies on

(a) The major axis of the ellipse

(b) The circle with radius e

(c) Another ellipse of eccentricity $\sqrt{\dfrac{3 + e^2}{4}}$

(d) None of these

22. If the coordinates of four concyclic points on the rectangular hyperbola $xy = c^2$ are $(ct_i, c/t_i)$, $i = 1, 2, 3, 4$ then

(a) $t_1 t_2 t_3 t_4 = -1$ (b) $t_1 t_2 t_3 t_4 = 1$

(c) $t_1 t_3 = t_2 t_4$ (d) $t_1 + t_2 + t_3 + t_4 = c^2$

23. From the origin, chords are drawn to the circle $(x - 1)^2 + y^2 = 1$, then equation of locus of middle points of these chords, is -

(a) $x^2 + y^2 = 1$ (b) $x^2 + y^2 = x$

(c) $x^2 + y^2 = y$ (d) None of these

24. If $P \equiv (x, y), F_1 \equiv (3, 0), F_2 \equiv (-3, 0)$ and $16x^2 + 25y^2 = 400$, then $PF_1 + PF_2$ equals

(a) 8   (b) 6

(c) 10   (d) 12

RESPONSE GRID					
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ

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25. The combined equation of the asymptotes of the hyperbola $2x^2 + 5xy + 2y^2 + 4x + 5y = 0$ is –
(a) $2x^2 + 5xy + 2y^2 + 4x + 5y + 2 = 0$
(b) $2x^2 + 5xy + 2y^2 + 4x + 5y - 2 = 0$
(c) $2x^2 + 5xy + 2y^2 = 0$
(d) None of these

26. The common chord of $x^2 + y^2 - 4x - 4y = 0$ and $x^2 + y^2 = 16$ subtends at the origin an angle equal to
(a) $\dfrac{\pi}{6}$
(b) $\dfrac{\pi}{4}$
(c) $\dfrac{\pi}{3}$
(d) $\dfrac{\pi}{2}$

27. The equation of one of the common tangents to the parabola $y^2 = 8x$ and $x^2 + y^2 - 12x + 4 = 0$ is
(a) $y = -x + 2$
(b) $y = x - 2$
(c) $y = x + 2$
(d) None of these

28. If the axes of an ellipse coincides with the co-ordiante axes and it passes through the point $(4, -1)$ and touches the line $x + 4y - 10 = 0$ then the eq. is

(a) $\dfrac{x^2}{80} + \dfrac{y^2}{5/4} = 1$
(b) $\dfrac{x^2}{20} + \dfrac{y^2}{5} = 1$
(c) $\dfrac{x^2}{100} + \dfrac{y^2}{5} = 1$
(d) Both (a) and (b)

29. A double ordinate of the parabola $y^2 = 4ax$ is of length $8a$. It subtends an angle at the vertex equal to
(a) $\dfrac{\pi}{2}$
(b) $\dfrac{\pi}{4}$
(c) $\dfrac{\pi}{6}$
(d) $\dfrac{2\pi}{3}$

30. The equation of the image of circle $x^2 + y^2 + 16x - 24y + 183 = 0$ by the line mirror $4x + 7y + 13 = 0$ is
(a) $x^2 + y^2 + 32x - 4y + 235 = 0$
(b) $x^2 + y^2 + 32x + 4y - 235 = 0$
(c) $x^2 + y^2 + 32x - 4y - 235 = 0$
(d) $x^2 + y^2 + 32x + 4y + 235 = 0$

RESPONSE GRID	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ				

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 11 - MATHEMATICS

Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	37	Qualifying Score	50
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			