Shiksha Classes Bhandara

Mathematics **Topic : Circle** **MM 100**

Q.1 Equation of a circle S(x, y) = 0, (S(2, 3) = 16) which touches the line $3x + 4y - 7 = 0$ at (1, 1) is given by
(A) $x^2 + y^2 + x + 2y - 5 = 0$ (B) $x^2 + y^2 + 2x + 2y - 6 = 0$
(C) $x^2 + y^2 + 4x - 6y = 0$ (D) none of these

Q.2 A variable chord is drawn through the origin to the circle $x^2 + y^2 - 2ax = 0$. The locus of the centre of the circle drawn on this chord as diameter is –
(A) $x^2 + y^2 + ax = 0$ (B) $x^2 + y^2 + ay = 0$
(C) $x^2 + y^2 - ax = 0$ (D) $x^2 + y^2 - ay = 0$

Q.3 Equation of chord AB of circle $x^2 + y^2 = 2$ passing through P(2, 2) such that PB/PA = 3, is given by-
(A) $x = 3y$ (B) $x = y$
(C) $y - 2 = \sqrt{3}(x - 2)$ (D) none of these

Q.4 If the tangents are drawn from any point on the line $x + y = 3$ to the circle $x^2 + y^2 = 9$, then the chord of contact passes through the point –
(A) (3, 5) (B) (3, 3)
(C) (5, 3) (D) None of these

Q.5 Centre of that circle which cuts the circles
$S_1 \equiv x^2 + y^2 = 4, S_2 \equiv (x-4)^2 + (y-4)^2 = 4$
$S_3 \equiv x^2 + y^2 - 6x + 8y + 24 = 0$ orthogonally is
(A) $\left(\frac{2}{7}, \frac{30}{7}\right)$ (B) $\left(-\frac{30}{7}, \frac{2}{7}\right)$
(C) $\left(\frac{30}{7}, \frac{2}{7}\right)$ (D) $\left(\frac{30}{7}, -\frac{2}{7}\right)$

Q.6 Area of triangle formed by common tangents to the circle $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 + 2x = 0$ is –
(A) $3\sqrt{3}$ (B) $2\sqrt{3}$
(C) $9\sqrt{3}$ (D) $6\sqrt{3}$

Q.7 The equation of the circle which passes through the origin and cuts off intercepts of lengths 4 and 6 units along the axes is
(A) $x^2 - 4x + y^2 - 6y = 0$ (B) $x^2 + 4x + y^2 + 6y = 10$
(C) $x^2 - 2x + y^2 - 3y = 0$ (D) $x^2 + 2x + y^2 + 3y = 0$

Q.8 A square is inscribed in the circle $x^2 + y^2 - 2x + 4y + 3 = 0$, whose sides are parallel to coordinate axes. One vertex of the square is –
(A) $(1+\sqrt{2}, -2)$ (B) $(1-\sqrt{2}, -2)$
(C) (–2, 1) (D) (2, –3)

Q.9 The triangle PQR is inscribed in the circle $x^2 + y^2 = 25$. If Q and R have coordinates (3, 4) & (– 4, 3) respectively, then $\angle QPR$ is equal to :
(A) $\pi/2$ (B) $\pi/3$
(C) $\pi/4$ (D) $\pi/6$

Q.10 P is a point (a, b) in the first quadrant. If the two circles which pass through P and touch both the co-ordinate axes cut at right angles, then –
(A) $a^2 - 6ab + b^2 = 0$ (B) $a^2 + 2ab - b^2 = 0$
(C) $a^2 - 4ab + b^2 = 0$ (D) $a^2 - 8ab + b^2 = 0$

Q.11 The radical centre of three circles described on the three sides of a triangle as diameter is
(A) the centroid (B) the circumcenter
(C) the incentre of the triangle (D) the orthocenter

Q.12 Minimum radius of circle which is orthogonal with both the circles $x^2 + y^2 - 12x + 35 = 0$ and $x^2 + y^2 + 4x + 3 = 0$ is–
(A) 4 (B) 3
(C) (D) 1

Q.13 If $C_1 : x^2 + y^2 = (3+2\sqrt{2})^2$ be a circle and PA and PB are pair of tangents on C_1, where P is any point on the director circle of C_1, then the radius of smallest circle which touch C_1 externally and also the two tangents PA and PB is –
(A) $2\sqrt{2} - 3$ (B) $2\sqrt{2} - 1$
(C) $2\sqrt{2} + 1$ (D) 1

Q.14 The slope of the tangent at the point (h, h) of the circle $x^2 + y^2 = a^2$ is -
(A) 0 (B) 1
(C) – 1 (D) depend on h

Q.15 If two circles $(x - 1)^2 + (y - 3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect in two distinct point then
(A) $2 < r < 8$ (B) $r < 2$
(C) $r = 2$ (D) $r > 2$

Q.16 A (1, 0) and B (0, 1) and two fixed points on the circle $x^2 + y^2 = 1$. C is a variable point on this circle. As C moves, the locus of the orthocentre of the triangle ABC is
(A) $x^2 + y^2 - 2x - 2y + 1 = 0$
(B) $x^2 + y^2 - x - y = 0$
(C) $x^2 + y^2 = 4$
(D) $x^2 + y^2 + 2x - 2y + 1 = 0$

Q.17 If the circles, $x^2 + y^2 + 2x + 2ky + 6 = 0$ & $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally, then 'k' is :
(A) 2 or – 3/2 (B) –2 or – 3/2
(C) 2 or 3/2 (D) –2 or 3/2

Q.18 The co-axial system of circles given by $x^2 + y^2 + 2gx + c = 0$ for $c < 0$ represents –
(A) intersecting circles
(B) non-intersecting circles
(C) touching circles
(D) touching or non-intersecting circles

Q.19 The equation of a tangent from the origin to the circle $x^2 + y^2 - 2ax - 2by + b^2 = 0$ is
(A) $y = 0$ (B) $y = \left(\frac{b^2 - a^2}{2ab}\right) x$
(C) $y = \left(\frac{a^2 - b^2}{2ab}\right) x$ (D) $y = \left(\frac{b^2 - a^2}{ab}\right) x$

Q.20 The pair of a straight lines joining the origin to the points of inersection of the circles $x^2 + y^2 = a^2$ & $x^2 + y^2 + 2(gx + fy) = 0$ is
(A) $a^2(x^2 + y^2) - 2(gx + fy)^2 = 0$
(B) $a^2(x^2 + y^2) - 4(gx + fy)^2 = 0$
(C) $a^2(x^2 + y^2) + 4(gx + fy)^2 = 4$
(D) $x^2 + y^2 - (gx + fy)^2 = a^2$

For Q.21-Q.25 :

The answer to each question is a NUMERICAL VALUE.

Q.21 Radius ($R < 4$) of a circle which toches the circle $x^2 + y^2 = 16$ externally and angle between the direct common tangents is $\tan^{-1}(24/7)$ is –

Q.22 Two concentric circles are such that the smaller divides the larger into two regions of equal area. If the radius of the smaller circle is 2, then the length of the tangent from any point P on the larger circle to the smaller circle is –

Q.23 The common tangents of two circles intersecting orthogonally are perpendicular. If the ratio of their radii is p then $p + \frac{1}{p} =$

Q.24 The number of common tangents that can be drawn to the circle $x^2 + y^2 – 4x – 6y – 3 = 0$ and $x^2 + y^2 + 2x + 2y + 1 = 0$ is

Q.25 If a circle $S(x, y) = 0$ touches at the point (2, 3) of the line $x + y = 5$ and $S(1, 2) = 0$, then radius of such circle is $(1/X)$ units. Find the value of X.