MCQ Single Answer

1) If the tangents at the points P and Q on the circle $x^2 + y^2 - 2x + y = 5$ meet at the point $R(\frac{9}{4}, 2)$, then the area of the triangle PQR is:

A) $\frac{13}{8}$

B) $\frac{5}{8}$

C) $\frac{5}{4}$

D) $\frac{13}{4}$

Numerical Question

2) A circle passing through the point $P(\alpha, \beta)$ in the first quadrant touches the two coordinate axes at the points A and B. The point P is above the line AB. The point Q on the line segment AB is the foot of perpendicular from P on AB. If PQ is equal to 11 units, then the value of $\alpha\beta$ is

_____.

Numerical Question

3) Let the point $(p, p + 1)$ lie inside the region $E = \{(x, y) : 3 - x \leq y \leq \sqrt{9 - x^2}, 0 \leq x \leq 3\}$. If the set of all values of p is the interval (a, b), then $b^2 + b - a^2$ is equal to _____.

Numerical Question

4) Consider a circle $C_1 : x^2 + y^2 - 4x - 2y = \alpha - 5$. Let its mirror image in the line $y = 2x + 1$ be another circle $C_2 : 5x^2 + 5y^2 - 10fx - 10gy + 36 = 0$. Let r be the radius of C_2. Then $\alpha + r$ is equal to _____.

MCQ Single Answer

5) Let O be the origin and OP and OQ be the tangents to the circle $x^2 + y^2 - 6x + 4y + 8 = 0$ at the points P and Q on it. If the circumcircle of the triangle OPQ passes through the point $(\alpha, \frac{1}{2})$, then a value of α is

A) 1

B) $-\frac{1}{2}$

C) $\frac{5}{2}$

D) $\frac{3}{2}$

MCQ Single Answer

6) A line segment AB of length λ moves such that the points A and B remain on the periphery of a circle of radius λ. Then the locus of the point, that divides the line segment AB in the ratio 2 : 3, is a circle of radius

[JEE Main 2023 (Online) 10th April Morning Shift]

A) $\frac{2}{3}\lambda$

B) $\frac{3}{5}\lambda$

C) $\frac{\sqrt{19}}{7}\lambda$

D) $\frac{\sqrt{19}}{5}\lambda$

MCQ Single Answer

7) Let A be the point (1,2) and B be any point on the curve $x^2 + y^2 = 16$. If the centre of the locus of the point P, which divides the line segment AB in the ratio 3: 2 is the point $C(\alpha, \beta)$, then the length of the line segment AC is

[JEE Main 2023 (Online) 10th April Evening Shift]

A) $\frac{3\sqrt{5}}{5}$

B) $\frac{6\sqrt{5}}{5}$

C) $\frac{2\sqrt{5}}{5}$

D) $\frac{4\sqrt{5}}{5}$

Numerical Question

8) Two circles in the first quadrant of radii r_1 and r_2 touch the coordinate axes. Each of them cuts off an intercept of 2 units with the line $x + y = 2$. Then $r_1^2 + r_2^2 - r_1 r_2$ is equal to _____.

[JEE Main 2023 (Online) 12th April Morning Shift]

MCQ Single Answer

9) Let the centre of a circle C be (α, β) and its radius $r < 8$. Let $3x + 4y = 24$ and $3x - 4y = 32$ be two tangents and $4x + 3y = 1$ be a normal to C. Then $(\alpha - \beta + r)$ is equal to :

[JEE Main 2023 (Online) 13th April Evening Shift]

A) 7

B) 9

C) 5

D) 6

MCQ Single Answer

10) The number of common tangents, to the circles $x^2 + y^2 - 18x - 15y + 131 = 0$ and $x^2 + y^2 - 6x - 6y - 7 = 0$, is :

[JEE Main 2023 (Online) 15th April Morning Shift]

A) 4

B) 2

C) 3

D) 1

MCQ Single Answer

11) The locus of the mid points of the chords of the circle $C_1: (x - 4)^2 + (y - 5)^2 = 4$ which subtend an angle θ_i at the centre of the circle C_1, is a circle of radius r_i. If $\theta_1 = \frac{\pi}{3}, \theta_3 = \frac{2\pi}{3}$ and $r_1^2 = r_2^2 + r_3^2$, then θ_2 is equal to

[JEE Main 2023 (Online) 24th January Evening Shift]

A) $\frac{\pi}{2}$

B) $\frac{\pi}{4}$

C) $\frac{3\pi}{4}$

D) $\frac{\pi}{6}$

MCQ Single Answer

12) The points of intersection of the line $ax + by = 0, (a \neq b)$ and the circle $x^2 + y^2 - 2x = 0$ are $A(\alpha, 0)$ and $B(1, \beta)$. The image of the circle with AB as a diameter in the line $x + y + 2 = 0$ is :

[JEE Main 2023 (Online) 25th January Morning Shift]

A) $x^2 + y^2 + 5x + 5y + 12 = 0$

B) $x^2 + y^2 + 3x + 5y + 8 = 0$

C) $x^2 + y^2 - 5x - 5y + 12 = 0$

D) $x^2 + y^2 + 3x + 3y + 4 = 0$

Numerical Question

13) Points P(−3, 2), Q(9, 10) and R(α, 4) lie on a circle C and PR as its diameter. The tangents to C at the points Q and R intersect at the point S. If S lies on the line $2x - ky = 1$, then k is equal to _____.

MCQ Single Answer

14) Let the tangents at the points $A(4, -11)$ and $B(8, -5)$ on the circle $x^2 + y^2 - 3x + 10y - 15 = 0$, intersect at the point C. Then the radius of the circle, whose centre is C and the line joining A and B is its tangent, is equal to

A) $\frac{2\sqrt{13}}{3}$

B) $\frac{3\sqrt{3}}{4}$

C) $\sqrt{13}$

D) $2\sqrt{13}$

Numerical Question

15) A circle with centre (2, 3) and radius 4 intersects the line $x + y = 3$ at the points P and Q. If the tangents at P and Q intersect at the point $S(\alpha, \beta)$, then $4\alpha - 7\beta$ is equal to _____.

MCQ Single Answer

16) Let $y = x + 2, 4y = 3x + 6$ and $3y = 4x + 1$ be three tangent lines to the circle $(x - h)^2 + (y - k)^2 = r^2$. Then $h + k$ is equal to :

A) 6

B) 5 $(1 + \sqrt{2})$

C) 5

D) $5\sqrt{2}$

Numerical Question

17) Let $P(a_1, b_1)$ and $Q(a_2, b_2)$ be two distinct points on a circle with center $C(\sqrt{2}, \sqrt{3})$. Let O be the origin and OC be perpendicular to both CP and CQ. If the area of the triangle OCP is $\frac{\sqrt{35}}{2}$, then $a_1^2 + a_2^2 + b_1^2 + b_2^2$ is equal to :

MCQ Single Answer

18) Let a circle C_1 be obtained on rolling the circle $x^2 + y^2 - 4x - 6y + 11 = 0$ upwards 4 units on the tangent T to it at the point (3,2). Let C_2 be the image of C_1 in T. Let A and B be the centers of circles C_1 and C_2 respectively, and M and N be respectively the feet of perpendiculars drawn from A and B on the x-axis. Then the area of the trapezium AMNB is :

[JEE Main 2023 (Online) 31st January Morning Shift]

A) $2(2 + \sqrt{2})$

B) $4(1 + \sqrt{2})$

C) $3 + 2\sqrt{2}$

D) $2(1 + \sqrt{2})$

MCQ Single Answer

Numerical Question

19) The set of all values of a^2 for which the line $x + y = 0$ bisects two distinct chords drawn from a point $P(\frac{1+a}{2}, \frac{1-a}{2})$ on the circle $2x^2 + 2y^2 - (1 + a)x - (1 - a)y = 0$, is equal to :

[JEE Main 2023 (Online) 31st January Evening Shift]

A) $(0,4]$

B) $(4, \infty)$

C) $(2,12]$

D) $(8, \infty)$

Numerical Question

20) Let $S = \{(x, y) \in \mathbb{N} \times \mathbb{N}: 9(x - 3)^2 + 16(y - 4)^2 \leq 144\}$ and $T = \{(x, y) \in \mathbb{R} \times \mathbb{R}: (x - 7)^2 + (y - 4)^2 \leq 36\}$. Then $n(S \cap T)$ is equal to _____.

[JEE Main 2022 (Online) 29th July Evening Shift]

Numerical Question

21) Let AB be a chord of length 12 of the circle $(x - 2)^2 + (y + 1)^2 = \frac{169}{4}$. If tangents drawn to the circle at points A and B intersect at the point P, then five times the distance of point P from chord AB is equal to _____.
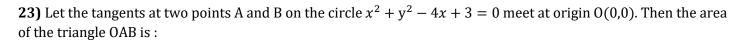
[JEE Main 2022 (Online) 29th July Evening Shift]

Numerical Question

22) Let the mirror image of a circle $c_1: x^2 + y^2 - 2x - 6y + \alpha = 0$ in line $y = x + 1$ be $c_2: 5x^2 + 5y^2 + 10gx + 10fy + 38 = 0$. If r is the radius of circle c_2, then $\alpha + 6r^2$ is equal to _____.

[JEE Main 2022 (Online) 29th July Morning Shift]

MCQ Single Answer

23) Let the tangents at two points A and B on the circle $x^2 + y^2 - 4x + 3 = 0$ meet at origin O(0,0). Then the area of the triangle OAB is :

A) $\frac{3\sqrt{3}}{2}$

B) $\frac{3\sqrt{3}}{4}$

C) $\frac{3}{2\sqrt{3}}$

D) $\frac{3}{4\sqrt{3}}$

MCQ Single Answer

24) The foot of the perpendicular from a point on the circle $x^2 + y^2 = 1, z = 0$ to the plane $2x + 3y + z = 6$ lies on which one of the following curves?

A) $(6x + 5y - 12)^2 + 4(3x + 7y - 8)^2 = 1, z = 6 - 2x - 3y$

B) $(5x + 6y - 12)^2 + 4(3x + 5y - 9)^2 = 1, z = 6 - 2x - 3y$

C) $(6x + 5y - 14)^2 + 9(3x + 5y - 7)^2 = 1, z = 6 - 2x - 3y$

D) $(5x + 6y - 14)^2 + 9(3x + 7y - 8)^2 = 1, z = 6 - 2x - 3y$

MCQ Single Answer

25) Let C be the centre of the circle $x^2 + y^2 - x + 2y = \frac{11}{4}$ and P be a point on the circle. A line passes through the point C, makes an angle of $\frac{\pi}{4}$ with the line CP and intersects the circle at the points Q and R. Then the area of the triangle PQR (in unit ^{2}) is :

A) 2

B) $2\sqrt{2}$

C) $8\sin\left(\frac{\pi}{8}\right)$

D) $8\cos\left(\frac{\pi}{8}\right)$

MCQ Single Answer

26) For t ∈ $(0, 2\pi)$, if ABC is an equilateral triangle with vertices A(sin $t, -\cos$ t), B(cost, sin t) and $C(a, b)$ such that its orthocentre lies on a circle with centre $(1, \frac{1}{3})$, then $(a^2 - b^2)$ is equal to :

A) $\frac{8}{3}$

B) 8

C) $\frac{77}{9}$

D) $\frac{80}{9}$

MCQ Single Answer

27) A circle C_1 passes through the origin O and has diameter 4 on the positive x-axis. The line $y = 2x$ gives a chord OA of circle C_1. Let C_2 be the circle with OA as a diameter. If the tangent to C_2 at the point A meets the x-axis at P and y-axis at Q, then QA: AP is equal to :

[JEE Main 2022 (Online) 27th July Evening Shift]

A) $1 : 4$

B) $1 : 5$

C) $2 : 5$

D) $1 : 3$

MCQ Single Answer

28) If the circle $x^2 + y^2 - 2gx + 6y - 19c = 0, g, c \in \mathbb{R}$ passes through the point $(6,1)$ and its centre lies on the line $x - 2cy = 8$, then the length of intercept made by the circle on x-axis is

[JEE Main 2022 (Online) 27th July Morning Shift]

A) $\sqrt{11}$

B) 4

C) 3

D) $2\sqrt{23}$

MCQ Single Answer

29) Let the abscissae of the two points P and Q on a circle be the roots of $x^2 - 4x - 6 = 0$ and the ordinates of P and Q be the roots of $y^2 + 2y - 7 = 0$. If PQ is a diameter of the circle $x^2 + y^2 + 2ax + 2by + c = 0$, then the value of $(a + b - c)$ is _____.

[JEE Main 2022 (Online) 26th July Evening Shift]

A) 12

B) 13

C) 14

D) 16

Numerical Question

30) If the circles $x^2 + y^2 + 6x + 8y + 16 = 0$ and $x^2 + y^2 + 2(3 - \sqrt{3})x + 2(4 - \sqrt{6})y = k + 6\sqrt{3} + 8\sqrt{6}, k > 0$, touch internally at the point $P(\alpha, \beta)$, then $(\alpha + \sqrt{3})^2 + (\beta + \sqrt{6})^2$ is equal to _____.

MCQ Single Answer

31) Consider three circles:
$$C_1 : x^2 + y^2 = r^2$$
$$C_2 : (x - 1)^2 + (y - 1)^2 = r^2$$
$$C_3 : (x - 2)^2 + (y - 1)^2 = r^2$$
If a line L : y = mx + c be a common tangent to C_1, C_2 and C_3 such that C_1 and C_3 lie on one side of line L while C_2 lies on other side, then the value of $20(r^2 + c)$ is equal to :

A) 23

B) 15

C) 12

D) 6

Numerical Question

32) Let a circle C : (x − h)² + (y − k)² = r², k >; 0, touch the x-axis at (1, 0). If the line x + y = 0 intersects the circle C at P and Q such that the length of the chord PQ is 2, then the value of h + k + r is equal to _____.

Numerical Question

33) Let the abscissae of the two points P and Q be the roots of $2x^2 - rx + p = 0$ and the ordinates of P and Q be the roots of $x^2 - sx - q = 0$. If the equation of the circle described on PQ as diameter is $2(x^2 + y^2) - 11x - 14y - 22 = 0$, then $2r + s - 2q + p$ is equal to _____.

MCQ Single Answer

34) Let a, b and c be the length of sides of a triangle ABC such that $\frac{a+b}{7} = \frac{b+c}{8} = \frac{c+a}{9}$. If r and R are the radius of incircle and radius of circumcircle of the triangle ABC, respectively, then the value of $\frac{R}{r}$ is equal to :

A) $\frac{5}{2}$

B) 2

C) $\frac{3}{2}$

D) 1

MCQ Single Answer

35) Let a circle C touch the lines $L_1: 4x - 3y + K_1 = 0$ and $L_2 = 4x - 3y + K_2 = 0$, $K_1, K_2 \in R$. If a line passing through the centre of the circle C intersects L₁ at $(-1,2)$ and L₂ at $(3, -6)$, then the equation of the circle C is :

[JEE Main 2022 (Online) 25th June Morning Shift]

A) $(x - 1)^2 + (y - 2)^2 = 4$

B) $(x + 1)^2 + (y - 2)^2 = 4$

C) $(x - 1)^2 + (y + 2)^2 = 16$

D) $(x - 1)^2 + (y - 2)^2 = 16$

MCQ Single Answer

36) A circle touches both the y-axis and the line x + y = 0. Then the locus of its center is :

[JEE Main 2022 (Online) 25th June Evening Shift]

A) $y = \sqrt{2}x$

B) $x = \sqrt{2}y$

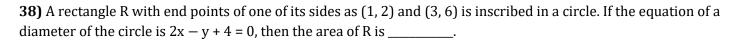**C)** $y^2 - x^2 = 2xy$

D) $x^2 - y^2 = 2xy$

MCQ Single Answer

37) Let C be a circle passing through the points $A(2, -1)$ and $B(3, 4)$. The line segment AB s not a diameter of C. If r is the radius of C and its centre lies on the circle $(x - 5)^2 + (y - 1)^2 = \frac{13}{2}$, then r² is equal to:

[JEE Main 2022 (Online) 26th June Morning Shift]

A) 32

B) $\frac{65}{2}$

C) $\frac{61}{2}$

D) 30

Numerical Question

38) A rectangle R with end points of one of its sides as (1, 2) and (3, 6) is inscribed in a circle. If the equation of a diameter of the circle is 2x − y + 4 = 0, then the area of R is _____.

Numerical Question

39) Let a circle C of radius 5 lie below the x-axis. The line $L_1 : 4x + 3y + 2 = 0$ passes through the centre P of the circle C and intersects the line $L_2 = 3x − 4y − 11 = 0$ at Q. The line L_2 touches C at the point Q. Then the distance of P from the line 5x − 12y + 51 = 0 is _____.

MCQ Single Answer

40) The set of values of k, for which the circle $C: 4x^2 + 4y^2 − 12x + 8y + k = 0$ lies inside the fourth quadrant and the point $(1, −\frac{1}{3})$ lies on or inside the circle C, is

A) an empty set

B) $(6, \frac{65}{9}]$

C) $[\frac{80}{9}, 10)$

D) $(9, \frac{92}{9}]$

Numerical Question

41) Let the lines $y + 2x = \sqrt{11} + 7\sqrt{7}$ and $2y + x = 2\sqrt{11} + 6\sqrt{7}$ be normal to a circle $C: (x − h)^2 + (y − k)^2 = r^2$. If the line $\sqrt{11}y − 3x = \frac{5\sqrt{77}}{3} + 11$ is tangent to the circle C, then the value of $(5h − 8k)^2 + 5r^2$ is equal to _____.

MCQ Single Answer

42) If the tangents drawn at the points $O(0,0)$ and $P(1 + \sqrt{5}, 2)$ on the circle $x^2 + y^2 − 2x − 4y = 0$ intersect at the point Q, then the area of the triangle OPQ is equal to

A) $\frac{3+\sqrt{5}}{2}$

B) $\frac{4+2\sqrt{5}}{2}$

C) $\frac{5+3\sqrt{5}}{2}$

D) $\frac{7+3\sqrt{5}}{2}$

Numerical Question

43) If one of the diameters of the circle $x^2 + y^2 - 2\sqrt{2}x - 6\sqrt{2}y + 14 = 0$ is a chord of the circle $(x - 2\sqrt{2})^2 + (y - 2\sqrt{2})^2 = r^2$, then the value of r² is equal to _____.

MCQ Single Answer

44) Let a triangle ABC be inscribed in the circle $x^2 - \sqrt{2}(x + y) + y^2 = 0$ such that $\angle BAC = \frac{\pi}{2}$. If the length of side AB is $\sqrt{2}$, then the area of the ΔABC is equal to :

A) 1

B) $(\sqrt{6} + \sqrt{3})/2$

C) $(3 + \sqrt{3})/4$

D) $(\sqrt{6} + 2\sqrt{3})/4$

MCQ Single Answer

45) Let the tangent to the circle C_1 x² + y² = 2 at the point M(−1, 1) intersect the circle C_2 : (x − 3)² + (y − 2)² = 5, at two distinct points A and B. If the tangents to C_2 at the points A and B intersect at N, then the area of the triangle ANB is equal to:

A) $\frac{1}{2}$

B) $\frac{2}{3}$

C) $\frac{1}{6}$

D) $\frac{5}{3}$

Numerical Question

46) Let B be the centre of the circle x² + y² − 2x + 4y + 1 = 0. Let the tangents at two points P and Q on the circle intersect at the point A(3, 1). Then $8.(\frac{area\Delta APQ}{area\Delta BPQ})$ is equal to _____.

Numerical Question

47) If the variable line 3x + 4y = α lies between the two
circles (x − 1)² + (y − 1)² = 1
and (x − 9)² + (y − 1)² = 4, without intercepting a chord on either circle, then the sum of all the integral values of α
is _____.

Numerical Question

48) Two circles each of radius 5 units touch each other at the point (1, 2). If the equation of their common tangent is 4x + 3y = 10, and C_1 (α, β) and C_2 (γ, δ), $C_1 \neq C_2$ are their centres, then $|(\alpha + \beta)(\gamma + \delta)|$ is equal to _____.

[JEE Main 2021 (Online) 27th August Evening Shift]

MCQ Single Answer

49) Let Z be the set of all integers,

$$A = \{(x, y) \in Z \times Z : (x - 2)^2 + y^2 \leq 4\}$$

$$B = \{(x, y) \in Z \times Z : x^2 + y^2 \leq 4\}$$

$$C = \{(x, y) \in Z \times Z : (x - 2)^2 + (y - 2)^2 \leq 4\}$$

If the total number of relation from A ∩ B to A ∩ C is 2^p, then the value of p is :

[JEE Main 2021 (Online) 27th August Evening Shift]

A) 16

B) 25

C) 49

D) 9

Numerical Question

50) Let the equation $x^2 + y^2 + px + (1 - p)y + 5 = 0$ represent circles of varying radius r ∈ (0, 5]. Then the number of elements in the set S = {q : q = p^2 and q is an integer} is _____.

[JEE Main 2021 (Online) 27th August Morning Shift]

MCQ Single Answer

51) A circle C touches the line x = 2y at the point (2, 1) and intersects the circle

$C_1 : x^2 + y^2 + 2y - 5 = 0$ at two points P and Q such that PQ is a diameter of C_1 Then the diameter of C is :

[JEE Main 2021 (Online) 26th August Evening Shift]

A) $7\sqrt{5}$

B) 15

C) $\sqrt{285}$

D) $4\sqrt{15}$

Numerical Question

52) The locus of a point, which moves such that the sum of squares of its distances from the points (0, 0), (1, 0), (0, 1), (1, 1) is 18 units, is a circle of diameter d. Then d² is equal to _____.

MCQ Single Answer

53) If a line along a chord of the circle 4x² + 4y² + 120x + 675 = 0, passes through the point (−30, 0) and is tangent to the parabola y² = 30x, then the length of this chord is :

A) 5

B) 7

C) $5\sqrt{3}$

D) $3\sqrt{5}$

MCQ Single Answer

54) Let $A = \{(x, y) \in R \times R | 2x^2 + 2y^2 - 2x - 2y = 1\}$, $B = \{(x, y) \in R \times R | 4x^2 + 4y^2 - 16y + 7 = 0\}$ and $C = \{(x, y) \in R \times R | x^2 + y^2 - 4x - 2y + 5 \le r^2\}$.

Then the minimum value of |r| such that $A \cup B \subseteq C$ is equal to

A) $\frac{3+\sqrt{10}}{2}$

B) $\frac{2+\sqrt{10}}{2}$

C) $\frac{3+2\sqrt{5}}{2}$

D) $1 + \sqrt{5}$

MCQ Single Answer

55) Two tangents are drawn from the point P(−1, 1) to the circle x² + y² − 2x − 6y + 6 = 0. If these tangents touch the circle at points A and B, and if D is a point on the circle such that length of the segments AB and AD are equal, then the area of the triangle ABD is equal to :

A) 2

B) $(3\sqrt{2} + 2)$

C) 4

D) $3(\sqrt{2} - 1)$

MCQ Single Answer

56) Consider a circle C which touches the y-axis at (0, 6) and cuts off an intercept $6\sqrt{5}$ on the x-axis. Then the radius of the circle C is equal to :

A) $\sqrt{53}$

B) 9

C) 8

D) $\sqrt{82}$

MCQ Single Answer

57) Let the circle S : 36x² + 36y² − 108x + 120y + C = 0 be such that it neither intersects nor touches the co-ordinate axes. If the point of intersection of the lines, x − 2y = 4 and 2x − y = 5 lies inside the circle S, then :

A) $\frac{25}{9} < C < \frac{13}{3}$

B) 100 < C < 165

C) 81 < C < 156

D) 100 < C < 156

MCQ Single Answer

58) Let $r_1$and r_2 be the radii of the largest and smallest circles, respectively, which pass through the point (−4, 1) and having their centres on the circumference of the circle x² + y² + 2x + 4y − 4 = 0. If $\frac{r_1}{r_2} = a + b\sqrt{2}$, then a + b is equal to :

A) 3

B) 11

C) 5

D) 7

MCQ Single Answer

59) Let $S_1 : x^2 + y^2 = 9$ and $S_2 : (x − 2)^2 + y^2 = 1$. Then the locus of center of a variable circle S which touches S_1 > internally and S_2 externally always passes through the points :

A) $\left(\frac{1}{2}, \pm\frac{\sqrt{5}}{2}\right)$

B) $(1, \pm 2)$

C) $\left(2, \pm\frac{3}{2}\right)$

D) $(0, \pm \sqrt{3})$

MCQ Single Answer

60) For the four circles M, N, O and P, following four equations are given :

Circle M : $x^2 + y^2 = 1$

Circle N : $x^2 + y^2 - 2x = 0$

Circle O : $x^2 + y^2 - 2x - 2y + 1 = 0$

Circle P : $x^2 + y^2 - 2y = 0$

If the centre of circle M is joined with centre of the circle N, further center of circle N is joined with centre of the circle O, centre of circle O is joined with the centre of circle P and lastly, centre of circle P is joined with centre of circle M, then these lines form the sides of a :

[JEE Main 2021 (Online) 18th March Morning Shift]

A) Rhombus

B) Square

C) Rectangle

D) Parallelogram

MCQ Single Answer

61) Choose the correct statement about two circles whose equations are given below :

$x^2 + y^2 - 10x - 10y + 41 = 0$

$x^2 + y^2 - 22x - 10y + 137 = 0$

[JEE Main 2021 (Online) 18th March Morning Shift]

A) circles have same centre

B) circles have no meeting point

C) circles have only one meeting point

D) circles have two meeting points

MCQ Single Answer

62) Two tangents are drawn from a point P to the circle $x^2 + y^2 - 2x - 4y + 4 = 0$, such that the angle between these tangents is $\tan^{-1}(\frac{12}{5})$, where $\tan^{-1}(\frac{12}{5}) \in (0, \pi)$. If the centre of the circle is denoted by C and these tangents touch the circle at points A and B, then the ratio of the areas of $\triangle PAB$ and $\triangle CAB$ is :

A) $3 : 1$

B) $9 : 4$

C) $2 : 1$

D) $11 : 4$

MCQ Single Answer

63) Let the tangent to the circle $x^2 + y^2 = 25$ at the point R(3, 4) meet x-axis and y-axis at points P and Q, respectively. If r is the radius of the circle passing through the origin O and having centre at the incentre of the triangle OPQ, then r^2 is equal to:

A) $\frac{585}{66}$

B) $\frac{625}{72}$

C) $\frac{529}{64}$

D) $\frac{125}{72}$

Numerical Question

64) The minimum distance between any two points P_1 and P_2 while considering point P_1 on one circle and point P_2 on the other circle for the given circles' equations

$x^2 + y^2 - 10x - 10y + 41 = 0$

$x^2 + y^2 - 24x - 10y + 160 = 0$ is _____.

MCQ Single Answer

65) Choose the incorrect statement about the two circles whose equations are given below :

$x^2 + y^2 - 10x - 10y + 41 = 0$ and

$x^2 + y^2 - 16x - 10y + 80 = 0$

A) Distance between two centres is the average of radii of both the circles.

B) Both circles pass through the centre of each other.

C) Circles have two intersection points.

D) Both circle's centers lie inside region of one another.

MCQ Single Answer

66) The line $2x - y + 1 = 0$ is a tangent to the circle at the point (2, 5) and the centre of the circle lies on $x - 2y = 4$. Then, the radius of the circle is :

[JEE Main 2021 (Online) 17th March Morning Shift]

A) $5\sqrt{3}$

B) $4\sqrt{5}$

C) $3\sqrt{5}$

D) $5\sqrt{4}$

MCQ Single Answer

67) Let the lengths of intercepts on x-axis and y-axis made by the circle
$x^2 + y^2 + ax + 2ay + c = 0$, $(a < 0)$ be $2\sqrt{2}$ and $2\sqrt{5}$, respectively. Then the shortest distance from origin to a tangent to this circle which is perpendicular to the line $x + 2y = 0$, is equal to :

[JEE Main 2021 (Online) 16th March Evening Shift]

A) $\sqrt{10}$

B) $\sqrt{6}$

C) $\sqrt{11}$

D) $\sqrt{7}$

MCQ Single Answer

68) If the locus of the mid-point of the line segment from the point (3, 2) to a point on the circle, $x^2 + y^2 = 1$ is a circle of radius r, then r is equal to :

[JEE Main 2021 (Online) 26th February Evening Shift]

A) $\frac{1}{4}$

B) $\frac{1}{2}$

C) 1

D) $\frac{1}{3}$

MCQ Single Answer

69) Let A(1, 4) and B(1, −5) be two points. Let P be a point on the circle
$(x − 1)^2 + (y − 1)^2 = 1$ such that $(PA)^2 + (PB)^2$ have maximum value, then the points, P, A and B lie on :

A) a straight line

B) an ellipse

C) a parabola

D) a hyperbola

MCQ Single Answer

70) In the circle given below, let OA = 1 unit, OB = 13 unit and PQ ⊥ OB. Then, the area of the triangle PQB (in square units) is :

<img src="https://imagex.cdn.examgoal.net/1kluw9enf/8d38a4db-2eff-4760-b1da-88c9142f49a0/0c7d5ac0-7cec-11eb-8f7b-79760a5d8011/file-1kluw9eng-245w.jpg" style="max-width: 100%;height: auto;display: block;margin: 0 auto;" loading="lazy" alt="JEE Main 2021 (Online) 26th February Morning Shift Mathematics - Circle Question 70 English">

A) $24\sqrt{2}$

B) $24\sqrt{3}$

C) $26\sqrt{2}$

D) $26\sqrt{3}$

MCQ Single Answer

71) If the curve $x^2 + 2y^2 = 2$ intersects the line $x + y = 1$ at two points P and Q, then the angle subtended by the line segment PQ at the origin is :

A) $\frac{\pi}{2} − \tan^{-1}\left(\frac{1}{4}\right)$

B) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{3}\right)$

C) $\frac{\pi}{2} − \tan^{-1}\left(\frac{1}{3}\right)$

D) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$

Numerical Question

72) If the area of the triangle formed by the positive x-axis, the normal and the tangent to the circle $(x − 2)^2 + (y − 3)^2 = 25$ at the point (5, 7) is A, then 24A is equal to _____.

Numerical Question

73) Let a point P be such that its distance from the point (5, 0) is thrice the distance of P from the point (−5, 0). If the locus of the point P is a circle of radius r, then 4r² is equal to _____

MCQ Single Answer

74) Let a, b, c be in arithmetic progression. Let the centroid of the triangle with vertices (a, c), (2, b) and (a, b) be $(\frac{10}{3}, \frac{7}{3})$. If α, β are the roots of the equation $ax^2 + bx + 1 = 0$, then the value of $\alpha^2 + \beta^2 - \alpha\beta$ is :

A) $\frac{69}{256}$

B) $\frac{71}{256}$

C) $-\frac{71}{256}$

D) $-\frac{69}{256}$

Numerical Question

75) If one of the diameters of the circle x² - 2x - 6y + 6 = 0 is a chord of another circle 'C', whose center is at (2, 1), then its radius is _____.

MCQ Single Answer

76) If the length of the chord of the circle,

x² + y² = r²
(r > 0) along the line, y – 2x = 3 is r,

then r²
is equal to :

A) $\frac{9}{5}$

B) $\frac{24}{5}$

C) $\frac{12}{5}$

D) 12

Numerical Question

77) Let PQ be a diameter of the circle $x^2 + y^2 = 9$. If α and β are the lengths of the perpendiculars from P and Q on the straight line,
$x + y = 2$ respectively, then the maximum value of $\alpha\beta$ is ____.

MCQ Single Answer

78) The circle passing through the intersection of the circles,
$x^2 + y^2 - 6x = 0$ and $x^2 + y^2 - 4y = 0$, having its centre on
the line, $2x - 3y + 12 = 0$, also passes through the point :

A) $(-3, 1)$

B) $(1, -3)$

C) $(-1, 3)$

D) $(-3, 6)$

Numerical Question

79) The diameter of the circle, whose centre lies on
the line $x + y = 2$ in the first quadrant and which
touches both the lines $x = 3$ and $y = 2$, is
_____ .

Numerical Question

80) The number of integral values of k for which
the line, $3x + 4y = k$ intersects the circle,

$x^2 + y^2 - 2x - 4y + 4 = 0$ at two distinct points is
____.

Numerical Question

81) If the curves, $x^2 - 6x + y^2 + 8 = 0$ and

$x^2 - 8y + y^2 + 16 - k = 0$, $(k > 0)$ touch each other
at a point, then the largest value of k is ____.

MCQ Single Answer

82) A circle touches the y-axis at the point (0, 4)
and passes through the point (2, 0). Which of
the following lines is not a tangent to this circle ?

A) $3x - 4y - 24 = 0$

B) $4x + 3y - 8 = 0$

C) $3x + 4y - 6 = 0$

D) $4x - 3y + 17 = 0$

MCQ Single Answer

83) If a line, $y = mx + c$ is a tangent to the circle,
$(x - 3)^2 + y^2 = 1$ and it is perpendicular to a line L_1, where L_1 is the tangent to the circle, $x^2 + y^2 = 1$ at the point
$(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$, then

A) $c^2 + 6c + 7 = 0$

B) $c^2 - 7c + 6 = 0$

C) $c^2 - 6c + 7 = 0$

D) $c^2 + 7c + 6 = 0$

MCQ Single Answer

84) Let the tangents drawn from the origin to the circle,
x^2
$+ y^2$
$- 8x - 4y + 16 = 0$ touch it at the
points A and B. The $(AB)^2$
is equal to:

A) $\frac{56}{5}$

B) $\frac{32}{5}$

C) $\frac{52}{5}$

D) $\frac{64}{5}$

MCQ Single Answer

85) A circle touching the x-axis at $(3, 0)$ and making an intercept of length 8 on the y-axis passes through the point :

A) $(1, 5)$

B) $(2, 3)$

C) $(3, 5)$

D) $(3, 10)$

MCQ Single Answer

86) A triangle has a vertex at $(1, 2)$ and the mid points of the two sides through it are $(-1, 1)$ and $(2, 3)$. Then the centroid of this triangle is :

A) $(\frac{1}{3}, 2)$

B) $(\frac{1}{3}, \frac{5}{3})$

C) $(1, \frac{7}{3})$

D) $(\frac{1}{3}, 1)$

MCQ Single Answer

87) If the angle of intersection at a point where the two circles with radii 5 cm and 12 cm intersect is $90°$, then the length (in cm) of their common chord is :
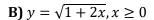
A) $\frac{13}{5}$

B) $\frac{60}{13}$

C) $\frac{120}{13}$

D) $\frac{13}{2}$

MCQ Single Answer

88) The locus of the centres of the circles, which touch the circle, $x^2 + y^2 = 1$ externally, also touch the y-axis and lie in the first quadrant, is

A) $x = \sqrt{1 + 2y}, y \geq 0$

B) $y = \sqrt{1 + 2x}, x \geq 0$

C) $y = \sqrt{1 + 4x}, x \geq 0$

D) $x = \sqrt{1 + 4y}, y \geq 0$

MCQ Single Answer

89) The line x = y touches a circle at the point (1,1). If the circle also passes through the point (1, − 3), then its radius is :

[JEE Main 2019 (Online) 10th April Morning Slot]

A) 3

B) 2

C) $2\sqrt{2}$

D) $3\sqrt{2}$

MCQ Single Answer

90) If the circles x² + y² + 5Kx + 2y + K = 0 and 2(x² + y²) + 2Kx + 3y −1 = 0, (K∈R), intersect at the points P and Q, then the line 4x + 5y − K = 0 passes through P and Q, for :

[JEE Main 2019 (Online) 10th April Morning Slot]

A) exactly two values of K

B) no value of K

C) exactly one value of K

D) infinitely many values of K

MCQ Single Answer

91) A rectangle is inscribed in a circle with a diameter lying along the line 3y = x + 7. If the two adjacent vertices of the rectangle are (−8, 5) and (6, 5), then the area of the rectangle (in sq. units) is :-

[JEE Main 2019 (Online) 9th April Evening Slot]

A) 72

B) 84

C) 56

D) 98

MCQ Single Answer

92) The common tangent to the circles x² + y² = 4 and x² + y² + 6x + 8y − 24 = 0 also passes through the point :-

A) $(6, -2)$

B) $(4, -2)$

C) $(-4, 6)$

D) $(-6, 4)$

MCQ Single Answer

93) If a tangent to the circle $x^2 + y^2 = 1$ intersects the coordinate axes at distinct points P and Q, then the locus of the mid-point of PQ is

[JEE Main 2019 (Online) 9th April Morning Slot]

A) $x^2 + y^2 - 4x^2y^2 = 0$

B) $x^2 + y^2 - 2xy = 0$

C) $x^2 + y^2 - x^2y^2 = 0$

D) $x^2 + y^2 - x^2y^2 = 0$

MCQ Single Answer

94) The tangent and the normal lines at the point
$(\sqrt{3}, 1)$ to the circle $x^2 + y^2 = 4$ and the x-axis form a triangle. The area of this triangle (in square units) is :

[JEE Main 2019 (Online) 8th April Evening Slot]

A) $\frac{4}{\sqrt{3}}$

B) $\frac{1}{\sqrt{3}}$

C) $\frac{2}{\sqrt{3}}$

D) $\frac{1}{3}$

MCQ Single Answer

95) The sum of the squares of the lengths of the chords
intercepted on the circle $x^2 + y^2 = 16$, by the lines,
$x + y = n, n \in N$, where N is the set of all natural
numbers, is :

[JEE Main 2019 (Online) 8th April Morning Slot]

A) 210

B) 160

C) 320

D) 105

MCQ Single Answer

96) If a circle of radius R passes through the origin O and intersects the coordinates axes at A and B, then the locus of the foot of perpendicular from O on AB is :

A) $(x^2 + y^2)^2 = 4R^2x^2y^2$

B) $(x^2 + y^2)(x + y) = R^2xy$

C) $(x^2 + y^2)^2 = 4Rx^2y^2$

D) $(x^2 + y^2)^3 = 4R^2x^2y^2$

MCQ Single Answer

97) Let C_1 and C_2 be the centres of the circles $x^2 + y^2 - 2x - 2y - 2 = 0$ and $x^2 + y^2 - 6x - 6y + 14 = 0$ respectively. If P and Q are the points of intersection of these circles, then the area (in sq. units) of the quadrilateral PC_1QC_2 is:

A) 4

B) 6

C) 9

D) 8

MCQ Single Answer

98) If a variable line, $3x + 4y - \lambda = 0$ is such that the two circles $x^2 + y^2 - 2x - 2y + 1 = 0$ and $x^2 + y^2 - 18x - 2y + 78 = 0$ are on its opposite sides, then the set of all values of λ is the interval :

A) (23, 31)

B) (2, 17)

C) [13, 23]

D) [12, 21]

MCQ Single Answer

99) Two circles with equal radii are intersecting at the points (0, 1) and (0, -1). The tangent at the point (0, 1) to one of the circles passes through the centre of the other circle. Then the distance between the centres of these circles is :

A) $2\sqrt{2}$

B) $\sqrt{2}$

C) 2

D) 1

MCQ Single Answer

100) A square is inscribed in the circle $x^2 + y^2$
$- 6x + 8y - 103 = 0$ with its sides parallel to the coordinate axes.
Then the distance of the vertex of this square which is nearest to the origin is :

[JEE Main 2019 (Online) 11th January Morning Slot]

A) $\sqrt{137}$

B) 6

C) $\sqrt{41}$

D) 13

MCQ Single Answer

101) The straight line $x + 2y = 1$ meets the coordinate axes at A and B. A circle is drawn through A, B and the origin. Then the sum of perpendicular distances from A and B on the tangent to the circle at the origin is

[JEE Main 2019 (Online) 11th January Morning Slot]

A) $4\sqrt{5}$

B) $\frac{\sqrt{5}}{2}$

C) $2\sqrt{5}$

D) $\frac{\sqrt{5}}{4}$

MCQ Single Answer

102) If the area of an equilateral triangle inscribed in the circle $x^2 + y^2$
$+ 10x + 12y + c = 0$ is $27\sqrt{3}$ sq units then c is equal to

[JEE Main 2019 (Online) 10th January Evening Slot]

A) 20

B) 25

C) $- 25$

D) 13

MCQ Single Answer

103) If a circle C passing through the point (4, 0) touches the circle $x^2 + y^2 + 4x - 6y = 12$ externally at the point (1, – 1), then the radius of C is -

[JEE Main 2019 (Online) 10th January Morning Slot]

A) 5

B) $2\sqrt{5}$

C) 4

D) $\sqrt{37}$

MCQ Single Answer

104) If the circles

$x^2 + y^2 - 16x - 20y + 164 = r^2$

$and (x - 4)^2 + (y - 7)^2 = 36$

intersect at two distinct points, then :

[JEE Main 2019 (Online) 9th January Evening Slot]

A) r > 11

B) 0 < r < 1

C) r = 11

D) 1 < r < 11

MCQ Single Answer

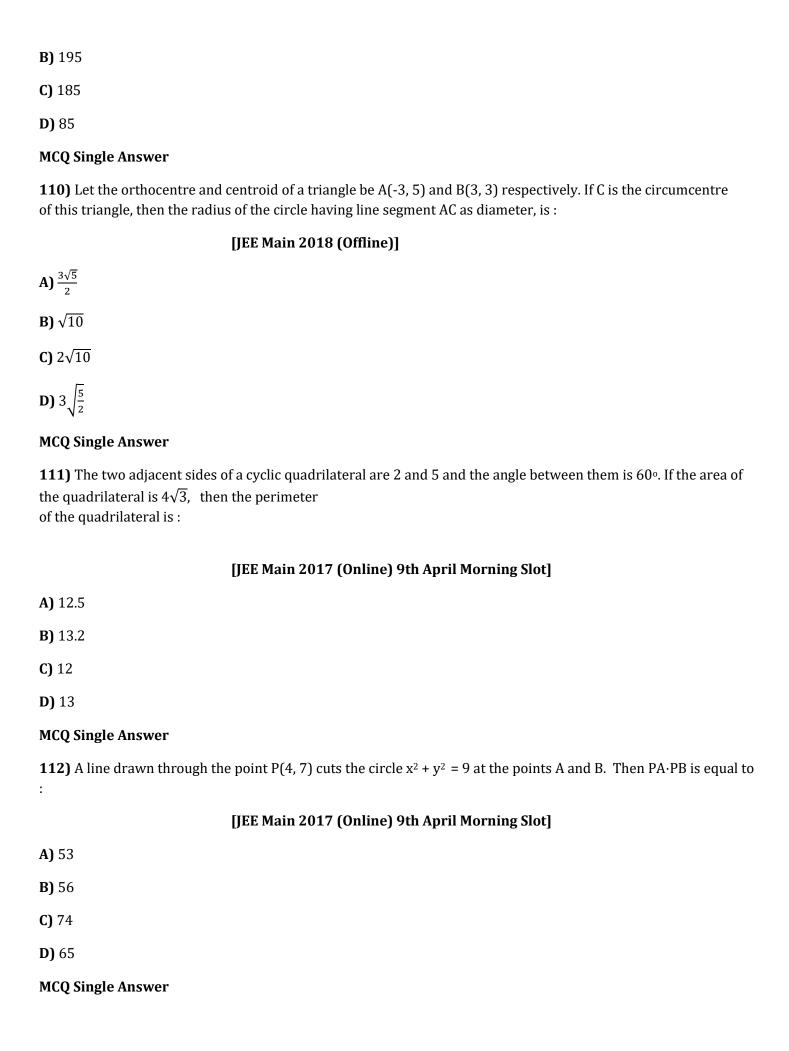**105)** Three circles of radii a, b, c (a < b < c) touch each other externally. If they have x-axis as a common tangent, then :

[JEE Main 2019 (Online) 9th January Morning Slot]

A) a, b, c are in A.P.

B) $\sqrt{a}, \sqrt{b}, \sqrt{c}$ are in A.P

C) $\frac{1}{\sqrt{b}} + \frac{1}{\sqrt{c}} = \frac{1}{\sqrt{a}}$

D) $\frac{1}{\sqrt{b}} = \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{c}}$

MCQ Single Answer

106) If a circle C, whose radius is 3, touches externally the circle,

$x^2 + y^2 + 2x - 4y - 4 = 0$ at the point (2, 2), then the length of the intercept cut by this circle C, on the x-axis is equal to :

A) $2\sqrt{5}$

B) $3\sqrt{2}$

C) $\sqrt{5}$

D) $2\sqrt{3}$

MCQ Single Answer

107) The tangent to the circle $C_1 : x^2 + y^2 - 2x - 1 = 0$ at the point (2, 1) cuts off a chord of length 4 from a circle C_2 whose center is (3, −2). The radius of C_2 is :

A) 2

B) $\sqrt{2}$

C) 3

D) $\sqrt{6}$

MCQ Single Answer

108) A circle passes through the points (2, 3) and (4, 5). If its centre lies on the line, $y - 4x + 3 = 0$, then its radius is equal to :

A) 2

B) $\sqrt{5}$

C) $\sqrt{2}$

D) 1

MCQ Single Answer

109) If the tangent at (1, 7) to the curve $x^2 = y - 6$

touches the circle $x^2 + y^2 + 16x + 12y + c = 0$, then the value of c is :

A) 95

B) 195

C) 185

D) 85

MCQ Single Answer

110) Let the orthocentre and centroid of a triangle be A(-3, 5) and B(3, 3) respectively. If C is the circumcentre of this triangle, then the radius of the circle having line segment AC as diameter, is :

[JEE Main 2018 (Offline)]

A) $\frac{3\sqrt{5}}{2}$

B) $\sqrt{10}$

C) $2\sqrt{10}$

D) $3\sqrt{\frac{5}{2}}$

MCQ Single Answer

111) The two adjacent sides of a cyclic quadrilateral are 2 and 5 and the angle between them is 60°. If the area of the quadrilateral is $4\sqrt{3}$, then the perimeter
of the quadrilateral is :

[JEE Main 2017 (Online) 9th April Morning Slot]

A) 12.5

B) 13.2

C) 12

D) 13

MCQ Single Answer

112) A line drawn through the point P(4, 7) cuts the circle $x^2 + y^2 = 9$ at the points A and B. Then PA·PB is equal to :

[JEE Main 2017 (Online) 9th April Morning Slot]

A) 53

B) 56

C) 74

D) 65

MCQ Single Answer

113) The equation

$\text{Im} \left(\frac{iz-2}{z-i} \right) + 1 = 0, z \in C , z \neq i$

represents a part of a circle having radius
equal to :

A) 2

B) 1

C) $\frac{3}{4}$

D) $\frac{1}{2}$

MCQ Single Answer

114) If a point P has co-ordinates $(0, -2)$ and Q is any point on the circle, $x^2 + y^2 - 5x - y + 5 = 0$, then the maximum value of $(PQ)^2$ is :

A) $\frac{25+\sqrt{6}}{2}$

B) $14 + 5\sqrt{3}$

C) $\frac{47+10\sqrt{6}}{2}$

D) $8 + 5\sqrt{3}$

MCQ Single Answer

115) The radius of a circle, having minimum area, which touches the curve $y = 4 - x^2$ and the lines, $y = |x|$ is :

A) $2(\sqrt{2} - 1)$

B) $4(\sqrt{2} - 1)$

C) $4(\sqrt{2} + 1)$

D) $2(\sqrt{2} + 1)$

MCQ Single Answer

116) Equation of the tangent to the circle, at the point $(1, -1)$, whose centre is the point of intersection of the straight lines $x - y = 1$ and $2x + y = 3$ is :

A) 4x + y − 3 = 0

B) x + 4y + 3 = 0

C) 3x − y − 4 = 0

D) x − 3y − 4 = 0

MCQ Single Answer

117) A circle passes through (−2, 4) and touches the y-axis at (0, 2). Which one of the following equations can represent a diameter of this circle ?

[JEE Main 2016 (Online) 9th April Morning Slot]

A) 4x + 5y − 6 = 0

B) 2x − 3y + 10 = 0

C) 3x + 4y − 3 = 0

D) 5x + 2y + 4 = 0

MCQ Single Answer

118) If one of the diameters of the circle, given by the equation, $x^2 + y^2 - 4x + 6y - 12 = 0$, is a chord of a circle S, whose centre is at $(-3,2)$, then the radius of S is:

[JEE Main 2016 (Offline)]

A) 5

B) 10

C) $5\sqrt{2}$

D) $5\sqrt{3}$

MCQ Single Answer

119) The centres of those circles which touch the circle, $x^2 + y^2 - 8x - 8y - 4 = 0$, externally and also touch the x-axis, lie on:

[JEE Main 2016 (Offline)]

A) a circle

B) an ellipse which is not a circle

C) a hyperbola

D) a parabola

MCQ Single Answer

120) The number of common tangents to the circles $x^2 + y^2 - 4x - 6x - 12 = 0$ and $x^2 + y^2 + 6x + 18y + 26 = 0$, is :

[JEE Main 2015 (Offline)]

A) 3

B) 4

C) 1

D) 2

MCQ Single Answer

121) Locus of the image of the point (2,3) in the line $(2x - 3y + 4) + k(x - 2y + 3) = 0, k \in R$, is a:

[JEE Main 2015 (Offline)]

A) circle of radius $\sqrt{2}$.

B) circle of radius $\sqrt{3}$.

C) straight line parallel to x-axis

D) straight line parallel to y-axis

MCQ Single Answer

122) Let C be the circle with centre at (1,1) and radius = 1. If T is the circle centred at $(0, y)$, passing through origin and touching the circle C externally, then the radius of T is equal to

[JEE Main 2014 (Offline)]

A) $\frac{1}{2}$

B) $\frac{1}{4}$

C) $\frac{\sqrt{3}}{\sqrt{2}}$

D) $\frac{\sqrt{3}}{2}$

MCQ Single Answer

123) The circle passing through $(1, -2)$ and touching the axis of x at (3,0) also passes through the point

[JEE Main 2013 (Offline)]

A) $(-5,2)$

B) $(2, -5)$

C) $(5, -2)$

D) $(-2,5)$

MCQ Single Answer

124) The length of the diameter of the circle which touches the x-axis at the point (1,0) and passes through the point (2,3) is:

A) $\frac{10}{3}$

B) $\frac{3}{5}$

C) $\frac{6}{5}$

D) $\frac{5}{3}$

MCQ Single Answer

125) The two circles x² + y² > = ax, and x² + y² = c² (c > 0) touch each other if

A) | a | = c

B) a = 2c

C) | a | = 2c

D) 2 | a | = c

MCQ Single Answer

126) The circle $x^2 + y^2 = 4x + 8y + 5$ intersects the line $3x - 4y - m$ at two distinct points if

A) $-35 < m < 15$

B) $15 < m < 65$

C) $35 < m < 85$

D) $-85 < m < -35$

MCQ Single Answer

127) If P and Q are the points of intersection of the circles

$x^2 + y^2 + 3x + 7y + 2p - 5 = 0$ and $x^2 + y^2 + 2x + 2y - p^2 = 0$ then there is a circle passing through P, Q and (1,1) for:

A) all except one value of p

B) all except two values of p

C) exactly one value of p

D) all values of p

MCQ Single Answer

128) The differential equation of the family of circles with fixed radius 5 units and centre on the line $y = 2$ is

[AIEEE 2008]

A) $(x - 2)y^2 = 25 - (y - 2)^2$

B) $(y - 2)y^2 = 25 - (y - 2)^2$

C) $(y - 2)^2 y^2 = 25 - (y - 2)^2$

D) $(x - 2)^2 y^2 = 25 - (y - 2)^2$

MCQ Single Answer

129) The point diametrically opposite to the point $P(1,0)$ on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is

[AIEEE 2008]

A) $(3, -4)$

B) $(-3, 4)$

C) $(-3, -4)$

D) $(3, 4)$

MCQ Single Answer

130) Consider a family of circles which are passing through the point $(-1,1)$ and are tangent to x-axis. If (h, k) are the coordinate of the centre of the circles, then the set of values of k is given by the interval

[AIEEE 2007]

A) $-\frac{1}{2} \leq k \leq \frac{1}{2}$

B) $k \leq \frac{1}{2}$

C) $0 \leq k \leq \frac{1}{2}$

D) $k \geq \frac{1}{2}$

MCQ Single Answer

131) Let C be the circle with centre $(0,0)$ and radius 3 units. The equation of the locus of the mid points of the chords of the circle C that subtend an angle of $\frac{2\pi}{3}$ at its center is

[AIEEE 2006]

A) $x^2 + y^2 = \frac{3}{2}$

B) $x^2 + y^2 = 1$

C) $x^2 + y^2 = \frac{27}{4}$

D) $x^2 + y^2 = \frac{9}{4}$

MCQ Single Answer

132) If the lines $3x - 4y - 7 = 0$ and $2x - 3y - 5 = 0$ are two diameters of a circle of area 49π square units, the equation of the circle is

[AIEEE 2006]

A) $x^2 + y^2 + 2x - 2y - 47 = 0$

B) $x^2 + y^2 + 2x - 2y - 62 = 0$

C) $x^2 + y^2 - 2x + 2y - 62 = 0$

D) $x^2 + y^2 - 2x + 2y - 47 = 0$

MCQ Single Answer

133) If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sector then

[AIEEE 2005]

A) $3a^2 - 10ab + 3b^2 = 0$

B) $3a^2 - 2ab + 3b^2 = 0$

C) $3a^2 + 10ab + 3b^2 = 0$

D) $3a^2 + 2ab + 3b^2 = 0$

MCQ Single Answer

134) If the circles $x^2 + y^2 + 2ax + cy + a = 0$ and $x^2 + y^2 - 3ax + dy - 1 = 0$ intersect in two ditinct points P and Q then the line 5x + by - a = 0 passes through P and Q for

[AIEEE 2005]

A) exactly one value of a

B) no value of a

C) infinitely many values of a

D) exactly two values of a

MCQ Single Answer

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

A) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - p^2) = 0$

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

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

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

MCQ Single Answer

136) A circle touches the x-axis and also touches the circle with centre at (0, 3) and radius 2. The locus of the centre of the circle is

A) an ellipse

B) a circle

C) a hyperbola

D) a parabola

MCQ Single Answer

137) Intercept on the line y = x by the circle $x^2 + y^2 - 2x = 0$ is AB. Equation of the circle on AB as a diameter is

A) $x^2 + y^2 + x - y = 0$

B) $x^2 + y^2 - x + y = 0$

C) $x^2 + y^2 + x + y = 0$

D) $x^2 + y^2 - x - y = 0$

MCQ Single Answer

138) 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) $2ax + 2by + (a^2 + b^2 + 4) = 0$

MCQ Single Answer

139) If the lines 2x + 3y + 1 + 0 and 3x - y - 4 = 0 lie along diameter of a circle of circumference 10π, then the equation of the circle is

A) $x^2 + y^2 + 2x - 2y - 23 = 0$

B) $x^2 + y^2 - 2x - 2y - 23 = 0$

C) $x^2 + y^2 + 2x + 2y - 23 = 0$

D) $x^2 + y^2 - 2x + 2y - 23 = 0$

MCQ Single Answer

140) A variable circle passes through the fixed point A (p, q) and touches x-axis. The locus of the other end of the diameter through A is

A) $(y - q)^2 = 4px$

B) $(x - q)^2 = 4py$

C) $(y - p)^2 = 4qx$

D) $(x - p)^2 = 4qy$

MCQ Single Answer

141) The lines 2x - 3y = 5 and 3x - 4y = 7 are diameters of a circle having area as 154 sq. units. Then the equation of the circle is

A) $x^2 + y^2 - 2x + 2y = 62$

B) $x^2 + y^2 + 2x - 2y = 62$

C) $x^2 + y^2 + 2x - 2y = 47$

D) $x^2 + y^2 - 2x + 2y = 47$

MCQ Single Answer

142) If the 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) $r > 2$

B) $2 < r < 8$

C) $r < 2$

D) $r = 2$.

MCQ Single Answer

143) The centres of a set of circles, each of radius 3, lie on the circle $x^2 + y^2 = 25$. The locus of any point in the set is

[AIEEE 2002]

A) $4 \leq x^2 + y^2 \leq 64$

B) $x^2 + y^2 \leq 25$

C) $x^2 + y^2 \geq 25$

D) $3 \leq x^2 + y^2 \leq 9$

MCQ Single Answer

144) The equation of a circle with origin as a center and passing thorough equilateral triangle whose median is of length $3\,a$ is

[AIEEE 2002]

A) $x^2 + y^2 = 9a^2$

B) $x^2 + y^2 = 16a^2$

C) $x^2 + y^2 = 4a^2$

D) $x^2 + y^2 = a^2$

MCQ Single Answer

145) The centre of the circle passing through (0, 0) and (1, 0) and touching the circle $x^2 + y^2 = 9$ is

[AIEEE 2002]

A) $\left(\frac{1}{2}, \frac{1}{2}\right)$

B) $\left(\frac{1}{2}, -\sqrt{2}\right)$

C) $\left(\frac{3}{2}, \frac{1}{2}\right)$

D) $\left(\frac{1}{2}, \frac{3}{2}\right)$

MCQ Single Answer

146) If the chord y = mx + 1 of the circle $x^2 + y^2 = 1$ subtends an angle of measure 45° at the major segment of the circle then value of m is

[AIEEE 2002]

A) $2 \pm \sqrt{2}$

B) $-2 \pm \sqrt{2}$

C) $-1 \pm \sqrt{2}$

D) none of these