1. 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, (3, –1), 120]**

(1) $x^2 + y^2 + 2x - 2y - 62 = 0$
(2) $x^2 + y^2 - 2x + 2y - 62 = 0$
(3) $x^2 + y^2 - 2x + 2y - 47 = 0$
(4) $x^2 + y^2 + 2x - 2y - 47 = 0$

2. 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 centre, is : **[AIEEE 2006, (3, –1), 120]**

(1) $x^2 + y^2 = 1$
(2) $x^2 + y^2 = \frac{27}{4}$
(3) $x^2 + y^2 = \frac{9}{4}$
(4) $(x^2 + y^2 = \frac{3}{2}$

3. Consider a family of circles which are passing through the point (–1, 1) and are tangent to x-axis. If (h, k) are the coordinates of the centre of the circles, then the set of values of k is given by the interval **[AIEEE 2007, (3, –1), 120]**

(1) $0 < k < 1 < 2$
(2) $k \geq 1/2$
(3) $-1/2 \leq k \leq 1/2$
(4) $k \leq 1/2$

4. The point diametrically opposite to the point P(1, 0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is **[AIEEE 2008, (3, –1), 120]**

(1) (3, –4)
(2) (–3, 4)
(3) (–3, –4)
(4) (3, 4)

5. 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 : **[AIEEE 2009, (4, –1), 144]**

(1) all except one value of p
(2) all except two values of p
(3) exactly one value of p
(4) all values of p

6. The circle $x^2 + y^2 = 4x + 8y + 5$ intersects the line $3x - 4y = m$ at two distinct points if **[AIEEE 2010, (4, –1), 144]**

(1) $-35 < m < 15$
(2) $15 < m < 65$
(3) $35 < m < 85$
(4) $-85 < m < -35$

7. The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2 (c > 0)$ touch each other if : **[AIEEE-2011, I, (4, –1), 120]**

(1) $2|a| = c$
(2) $|a| = c$
(3) $a = 2c$
(4) $|a| = 2c$

8. The equation of the circle passing through the point (1, 0) and (0, 1) and having the smallest radius is - **[AIEEE-2011, II, (4, –1), 120]**

(1) $x^2 + y^2 - 2x - 2y + 1 = 0$
(2) $x^2 + y^2 - x - y = 0$
(3) $x^2 + y^2 + 2x + 2y - 7 = 0$
(4) $x^2 + y^2 + x + y - 2 = 0$

9. 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 : **[AIEEE- 2012, (4, –1), 120]**

(1) $\frac{10}{3}$
(2) $\frac{3}{5}$
(3) $\frac{6}{5}$
(4) $\frac{5}{3}$

10. The circle passing through (1, –2) and touching the axis of x at (3, 0) also passes through the point **[AIEEE - 2013, (4, –¼), 120]**

(1) (–5, 2)
(2) (2, – 5)
(3) (5, – 2)
(4) (–2, 5)

11. 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, (4, – ¼), 120]**

(1) $\frac{1}{2}$
(2) $\frac{1}{4}$
(3) $\frac{\sqrt{3}}{\sqrt{2}}$
(4) $\frac{\sqrt{3}}{2}$

12. 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, (4, – ¼), 120]**

(1) straight line parallel to x-axis
(2) straight line parallel to y-axis
(3) circle of radius $\sqrt{2}$
(4) circle of radius $\sqrt{3}$

13. The number of common tangents to the circles $x^2 + y^2 - 4x - 6y - 12 = 0$ and $x^2 + y^2 + 6x + 18y + 26 = 0$, is **[JEE(Main) 2015, (4, – ¼), 120]**

(1) 1 (2) 2 (3) 3 (4) 4

14. 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, (4, – 1), 120]**

(1) an ellipse which is not a circle (2) a hyperbola
(3) a parabola (4) a circle

15. 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, (4, – 1), 120]**

(1) $5\sqrt{3}$ (2) 5 (3) 10 (4) $5\sqrt{2}$