1. The centre of the circle passing through (0, 0) (a, 0) and (0, b) is

(a) (a, b) (b*) $\left(\frac{a}{2},\frac{b}{2}\right)$ (c) $\left(-\frac{a}{2},-\frac{b}{2}\right)$ (d) (– a, – b)

2. The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y–axis of length

(a) 3 (b) 4 (c) 7 (d*) 1

3. The straight line y = mx + c cuts the circle $x^2 + y^2 = a^2$ in real points if

(a) $\sqrt{a^2(1+m^2)} < c$ (b) $\sqrt{a^2(1-m^2)} < c$

(c*) $\sqrt{a^2(1+m^2)} > c$ (d) $\sqrt{a^2(1-m^2)} > c$

4. The area of the circle centred at (1, 2) and passing through (4, 6) is

(a) 5π (b) 10 π (c*) 25 π (d) none of these

5. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a circle, the condition will be

(a) $a = b$ and $c = 0$ (b) $f = g$ and $h = 0$

(c*) $a = b$ and $h = 0$ (d) $f = g$ and $c = 0$

6. The equation of the circle passing through (4, 5) having the centre at (2, 2) is

(a) $x^2 + y^2 + 4x + 4y - 5 = 0$ (b*) $x^2 + y^2 - 4x - 4y - 5 = 0$

(c) $x^2 + y^2 - 4x - 13 = 0$ (d) $x^2 + y^2 - 4x - 4y + 5 = 0$

7. A line is drawn through a fixed point P (α, β) to cut the circle $x^2 + y^2 = r^2$ at A and B. Then PA . PB is equal to

(a) $(\alpha + \beta)^2 - r^2$ (b*) $\alpha^2 + \beta^2 - r^2$ (c) $(\alpha - \beta)^2 + r^2$ (d) None of these

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

(a) $\left(\frac{3}{2},\frac{1}{2}\right)$ (b) $\left(\frac{1}{2},\frac{3}{2}\right)$ (c) $\left(\frac{1}{2},\frac{1}{2}\right)$ (d*) $\left(\frac{1}{2},-\sqrt{2}\right)$

9. The equation $x^2 + y^2 + 2gx + 2fy + c = 0$ will represent a real circle if

(a) $g^2 + f^2 - c < 0$ (b*) $g^2 + f^2 - c \geq 0$

(c) always (d) none of these

10. One of the diameters of the circle $x^2 + y^2 - 12x + 4y + 6 = 0$ is given by

(a) x + y = 0 (b*) + 3y = 0 (c) x = y (d) 3x + 2y = 0

11. Area of the circle in which a chord of length √2 makes an angle π/2 at the centre is

(a) π/2 (b) 2 π (c*) π (d) π/4

12. If the lines $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ cut the coordinate axes in concyclic points, then

(a*) $a_1 a_2 = b_1 b_2$ (b) $a_1 b_2 = a_2 b_2$ (c) $a_1 b_2 = a_2 b_1$ (d) none of these

13. If the points (2, 0), (0, 1), (4, 5) and (0, c) are concyclic, then the value of c is

(a) 1 (b*) 14/3 (c) 5 (d) none of these

14. If two circles $(x - 1)^2 + (y - 3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect in two distinct points, then

(a*) 2 < r < 8 (b) r < 2 (c) r = 2 (d) r > 2

15. The lines 2x – 3y + 5 = 0 and 3x – 4y = 7 are diameters of a circle of area 154 sq. units, then the equation of the circle is

(a) $x^2 + y^2 + 2x - 2y - 62 = 0$ (b) $x^2 + y^2 + 2x - 2y - 47 = 0$

(c*) $x^2 + y^2 - 2x + 2y - 47 = 0$ (d) $x^2 + y^2 - 2x + 2y - 62 = 0$

16. The number of common tangents that can be drawn to the circles $x^2 + y^2 - 4x - 6y - 3 = 0$ and $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 1 (b) 2 (c*) 3 (d) 4

17. The circles whose equations are $x^2 + y^2 + c^2 = 2ax$ and $x^2 + y^2 + c^2 - 2by = 0$ will touch one another externally if

(a) $\frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{a^2}$ (b) $\frac{1}{c^2} + \frac{1}{a^2} = \frac{1}{b^2}$ (c*) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$ (d) none of these

18. The number of common tangents of the circles $x^2 + y^2 - 2x - 1 = 0$ and $x^2 + y^2 - 2y - 7 = 0$ is

(a*) 1 (b) 2 (c) 3 (d) 4

19. The length of the common chord of the circles $x^2 + y^2 + 4x + 1 = 0$ and $x^2 + y^2 + 4y - 1 = 0$ is

(a*) $\sqrt{\frac{15}{2}}$ (b) $\sqrt{15}$ (c) $2\sqrt{15}$ (d) None of these

20. The lines $3x - 4y + 4 = 0$ and $6x - 8y - 7 = 0$ are tangents to the same circle. Then its radius is

(a) 1/4 (b) 1/2 (c*) 3/4 (d) none of these

21. The equation $x^2 + y^2 + 4x + 6y + 13 = 0$ represents

(a) a circle (b) a pair of two straight lines
(c) a pair of coincident straight lines (d*) a point

22. 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) depends on h

23. The radical centre of three circles described on the three sides of a triangle as diameter is the

(a) orthocentre (b) circumcentre
(c*) incentre (d) centroid (e) triangle

24. The number of common tangents to the circles $x^2 + y^2 - x = 0$, $x^2 + y^2 + x = 0$ is

(a) 2 (b) 1 (c) 4 (d*) 3

25. The length of the tangent from (0, 0) to the circle $2(x^2 + y^2) + x - y + 5 = 0$ is

(a) $\sqrt{5}\,2$ (b) $\frac{\sqrt{5}}{2}$ (c) $\sqrt{2}$ (d*) $\sqrt{\frac{5}{2}}$