

1. Length of the median from B on AC where A (-1, 3), B (1, -1), C (5, 1) is  
 (a)  $\sqrt{18}$  (b\*)  $\sqrt{10}$  (c)  $2\sqrt{3}$  (d) 4
2. The equation of the circle whose centre is (-2, 4) and which passes through the point (3, -8) is  
 (a\*)  $x^2 + y^2 + 4x - 8y + 149 = 0$  (b)  $x^2 + y^2 + 4x - 8y - 149 = 0$   
 (c)  $x^2 + y^2 - 4x - 8y - 149 = 0$  (d) None of these
3. Points (2, 0), (0, 1), (4, 5) and (0, a) are concyclic for a =  
 (a)  $14/3$  or 1 (b) 14 or  $1/3$  (c\*)  $-14/3$  or -1 (d) None of these
4. 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\*)  $\sqrt{a^2(1-m^2)} > c$
5. 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
6. The area of the circle centred at (1, 2) and passing through (4, 6) is  
 (a)  $5\pi$  (b)  $10\pi$  (c)  $25\pi$  (d\*) None of these
7. A square is inscribed in the circle  $x^2 + y^2 - 2x + 4y + 3 = 0$  and its sides are parallel to the coordinate axes then one vertex of the square is  
 (a)  $(1 + \sqrt{2}, -2)$  (b\*)  $(1 - \sqrt{2}, -2)$  (c)  $(1, -2 + \sqrt{2})$  (d) None of these
8. The line joining (5, 0) to  $(10 \cos \theta, 10 \sin \theta)$  is divided internally in the ratio 2 : 3 at P. If  $\theta$  varies, then the locus of P is  
 (a) a pair of st. lines (b) a circle  
 (c) a st. line (d\*) None of these
9. A circle is inscribed in an equilateral triangle of side a. The area of any square inscribed in this circle is  
 (a)  $a^2/3$  (b)  $a^2/4$  (c\*)  $a^2/5$  (d)  $a^2/6$
10. The lines  $2x - 3y = 5$  and  $3x - 4y = 7$  are the diameters of a circle of area 154 sq. units. Then the equation of this circle is ( $\pi = 22/7$ )  
 (a)  $x^2 + y^2 + 2x - 2y = 62$  (b)  $x^2 + y^2 + 2x - 2y = 47$   
 (c)  $x^2 + y^2 - 2x + 2y = 47$  (d\*)  $x^2 + y^2 - 2x + 2y = 62$
11. The locus of the centre of a circle of radius 3 which rolls on the outside of the circle  $x^2 + y^2 + 3x - 6y - 9 = 0$  is  
 (a\*)  $x^2 + y^2 + 3x - 6y + 5 = 0$  (b)  $x^2 + y^2 + 3x - 6y - 31 = 0$   
 (c)  $x^2 + y^2 + 3x - 6y + 29/4 = 0$  (d) None of these

12. The equation of the circle passing through (0, 0) and intercepting lengths a and b on the axes is  
 (a)  $x^2 + y^2 - ax - by = 0$  (b)  $x^2 + y^2 + ax + by = 0$   
 (c\*)  $x^2 + y^2 - ax + by = 0$  (d) None of these
13. The equation of the circle which passes through the centre of the circle  $x^2 + y^2 + 8x + 10y - 7 = 0$  and is concentric with the circle  $2x^2 + 2y^2 - 8x - 12y - 9 = 0$   
 (a\*)  $x^2 + y^2 - 4x + 6y - 87 = 0$  (b)  $x^2 + y^2 + 4x - 6y - 87 = 0$   
 (c)  $x^2 + y^2 - 4x - 6y - 87 = 0$  (d) None of these
14. The equation of the circle which passes through the origin and making positive intercepts 3 and 4 units on the x and y axes respectively is  
 (a)  $x^2 + y^2 - 3x - 4y = 0$  (b)  $x^2 + y^2 - 3x + 4y = 0$   
 (c\*)  $x^2 + y^2 + 3x - 4y = 0$  (d) None of these
15. Two rods of lengths a and b slide along the axes which are rectangular in such a manner that their ends are concyclic. The locus of the centre of the circle passing through these points is  
 (a\*)  $4(x^2 + y^2) = a^2 + b^2$  (b)  $x^2 - y^2 = a^2 - b^2$   
 (c)  $4(x^2 - y^2) = a^2 - b^2$  (d)  $x^2 + y^2 = a^2 + b^2$
16. If the abscissae and ordinates of two points P and Q are the roots of the equations  $x^2 + 2ax - b^2 = 0$  and  $x^2 + 2px - q^2 = 0$  respectively, then the equation of the circle with PQ as diameter is  
 (a)  $x^2 + y^2 + 2ax + 2py - b^2 - q^2 = 0$  (b\*)  $x^2 + y^2 - 2ax - 2py + b^2 + q^2 = 0$   
 (c)  $x^2 + y^2 - 2ax - 2py - b^2 - q^2 = 0$  (d)  $x^2 + y^2 + 2ax + 2py + b^2 + q^2 = 0$
17. One of the diameters of the circle  $x^2 + y^2 - 12x + 4y + 6 = 0$  is given by  
 (a)  $x + y = 0$  (b)  $x + 3y = 0$  (c\*)  $x = y$  (d)  $3x + 2y = 0$
18. The length of the chord cut off by  $y = 2x + 1$  from the circle  $x^2 + y^2 = 2$  is  
 (a)  $\frac{5}{6}$  (b)  $\frac{6}{5}$  (c\*)  $\frac{6}{\sqrt{5}}$  (d)  $\frac{\sqrt{5}}{6}$
19. The equation of a circle with origin as centre and passing through the vertices of an equilateral triangle whose median is of length 3a is  
 (a)  $x^2 + y^2 = 9a^2$  (b)  $x^2 + y^2 = 16a^2$   
 (c\*)  $x^2 + y^2 = 4a^2$  (d)  $x^2 + y^2 = a^2$
20. The circles  $x^2 + y^2 - 10x + 16 = 0$  and  $x^2 + y^2 = r^2$  intersect each other in two distinct points if  
 (a)  $r < 2$  (b\*)  $r > 8$  (c)  $2 < r < 8$  (d)  $2 \leq r \leq 8$

21. A line is drawn through a fixed point  $P(\alpha, \beta)$  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
22. The equation of the circle which touches both the axes and the straight line  $4x + 3y = 6$  in the first quadrant and lies below it is  
 (a)  $4x^2 + 4y^2 - 4x - 4y + 1 = 0$  (b)  $x^2 + y^2 - 6x - 6y + 9 = 0$   
 (c)  $x^2 + y^2 - 6x - y + 9 = 0$  (d\*)  $4(x^2 + y^2 - x - 6y) + 1 = 0$
23. The locus of the centre of a circle which touches externally the circle  $x^2 + y^2 - 6x - 6y + 14 = 0$  and also touches the y-axis is given by the equation  
 (a)  $x^2 - 6x - 10y + 14 = 0$  (b\*)  $x^2 - 10x - 6y + 14 = 0$   
 (c)  $y^2 - 6x - 10y + 14 = 0$  (d)  $y^2 - 10x - 6y + 14 = 0$
24. If the distances from the origin of the centres of three circles  $x^2 + y^2 - 2\lambda x - c^2 = 0$  ( $i = 1, 2, 3$ ) are in GP, then the lengths of the tangents drawn to them from any point on the circle  $x^2 + y^2 = c^2$  are in  
 (a) AP (b) GP (c\*) HP (d) None of these
25. 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\*)  $a^2 + b^2 = c^2$
26. The circles  $x^2 + y^2 + x + y = 0$  and  $x^2 + y^2 + x - y = 0$  intersect at an angle of  
 (a)  $\pi/6$  (b\*)  $\pi/4$  (c)  $\pi/3$  (d)  $\pi/2$
27. If the chord of contact of tangents drawn from a point on the circle  $x^2 + y^2 = a^2$  to the circle  $x^2 + y^2 = b^2$  touches the circle  $x^2 + y^2 = c^2$ , then a, b, c are in  
 (a) AP (b\*) GP (c) HP (d) None of these
28. The locus of a point which moves such that the tangents from it to the two circles  $x^2 + y^2 - 5x - 3 = 0$  and  $3x^2 + 3y^2 + 2x + 4y - 6 = 0$  are equal, is given by  
 (a\*)  $2x^2 + 2y^2 + 7x + 4y - 3 = 0$  (b)  $17x + 4y + 3 = 0$   
 (c)  $4x^2 + 4y^2 - 3x + 4y - 9 = 0$  (d)  $13x - 4y + 15 = 0$
29. Equation of the circle which passes through the point  $(2, 0)$  and whose radical axis with respect to the circle  $x^2 + y^2 = 1$  is  $x = 1/2$  is given by  
 (a\*)  $x^2 + y^2 - 2x = 0$  (b)  $x^2 + y^2 + 2x = 0$   
 (c)  $x^2 + y^2 - 2y = 0$  (d)  $x^2 + y^2 + 2y = 0$
30. Coordinates of the pt. from which the lengths of tangents to the following three circles  $x^2 + y^2 = 4$ ,  $x^2 + y^2 - 2x - 4y + 1 = 0$ ,  $x^2 + y^2 - 4x - 2y + 1 = 0$ , are equal are  
 (a\*)  $(5/6, 5/6)$  (b)  $(5/6, 6/5)$  (c)  $(5/6, -5/6)$  (d)  $(-5/6, 5/6)$