Circle system

1. $y = mx$ is a chord of a circle of radius *a* and the diameter of the circle lies along *x*-axis and one end of this chord is origin. The equation of the circle described on this chord as diameter is

(a) $(1+m^2)(x^2+y^2)-2ax=0$ (b) $(1+m^2)(x^2+y^2)-2a(x+my)=0$

(c) $(1+m^2)(x^2+y^2)+2a(x+my)=0$ (d) $(1+m^2)(x^2+y^2)-2a(x-my)=0$

2. If $y = 2x$ is a chord of the circle $x^2+y^2-10x=0$, then the equation of the circle of which this chord is a diameter, is

(a) $x^2+y^2-2x+4y=0$ (b) $x^2+y^2+2x+4y=0$ (c) $x^2+y^2+2x-4y=0$ (d) $x^2+y^2-2x-4y=0$

3. 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) $(x-p)^2=4qy$

4. If $5x-12y+10=0$ and $12y-5x+16=0$ are two tangents to a circle, then the radius of the circle is

(a) 1 (b) 2 (c) 4 (d) 6

5. If $2x^2+\lambda xy+2y^2+(\lambda-4)x+6y-5=0$ is the equation of a circle then its radius is

(a) $3\sqrt{2}$ (b) $2\sqrt{3}$ (c) $2\sqrt{2}$ (d) None of these

6. Circles are drawn through the point (3, 0) to cut an intercept of length 6 units on the negative direction of the *x*-axis. The equation of the locus of their centres is

(a) The *x*-axis (b) $x-y=0$ (c) The *y*-axis (d) $x+y=0$

7. Circles $x^2+y^2=1$ and $x^2+y^2-8x+11=0$ cut off equal intercepts on a line through the point $\left(-2, \frac{1}{2}\right)$. The slope of the line is

(a) $\frac{-1+\sqrt{29}}{14}$ (b) $\frac{1+\sqrt{7}}{4}$ (c) $\frac{-1-\sqrt{29}}{14}$ (d) None of these

8. A region in the *x*-*y* plane is bounded by the curve $y=\sqrt{25-x^2}$ and the line *y* = 0. If the point $(a, a+1)$ lies in the interior of the region, then

(a) $a\in(-4, 3)$ (b) $a\in(-\infty,-1)\cup(3,+\infty)$ (c) $a\in(-1, 3)$ (d) None of these

9. If (2, 4) is a point interior to the circle $x^2+y^2-6x-10y+\lambda=0$ and the circle does not cut the axes at any point , then λ belongs to the interval

(a) (25, 32) (b) (9, 32) (c) (32, +∞) (d) None of these

10. If the circle $(x-h)^2+(y-k)^2=r^2$ is a tangent to the curve $y=x^2+1$ at a point (1, 2), then the possible location of the points (*h, k*) are given by

(a) $hk=5/2$ (b) $h+2k=5$ (c) $h^2-4k^2=5$ (d) $k^2=h^2+1$

11. The angle between the two tangents from the origin to the circle $(x-7)^2+(y+1)^2=25$ is

(a) 0 (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

12. Tangents are drawn from the point (4, 3) to the circle $x^2+y^2=9$. The area of the triangle formed by them and the line joining their points of contact is

(a) $\frac{24}{25}$ (b) $\frac{64}{25}$ (c) $\frac{192}{25}$ (d) $\frac{192}{5}$

13. $P(\sqrt{2}, \sqrt{2})$ is a point on the circle $x^2+y^2=4$ and *Q* is another point on the circle such that arc $PQ=\frac{1}{4}\times$ circumference. The coordinates of *Q* are

(a) $(-\sqrt{2}, -\sqrt{2})$ (b) $(\sqrt{2}, -\sqrt{2})$ (c) $(-\sqrt{2}, \sqrt{2})$ (d) None of these

14. Tangents drawn from (2, 0) to the circle $x^2+y^2=1$ touch the circle at *A* and *B*. Then

(a) $A=\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right), B=\left(-\frac{1}{2},-\frac{\sqrt{3}}{2}\right)$ (b) $A=\left(-\frac{1}{2},\frac{-\sqrt{3}}{2}\right), B=\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$

(c) $A=\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right), B=\left(\frac{1}{2},-\frac{\sqrt{3}}{2}\right)$ (d) $A=\left(\frac{1}{2},-\frac{\sqrt{3}}{2}\right), B=\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$

15. If the polar of a point (*p, q*) with respect to the circle $x^2 + y^2 = a^2$ touches the circle $(x-c)^2 + (y-d)^2 = b^2$, then

(a) $b^2(p^2 + q^2) = (a^2 - cp - qd)^2$

(b) $b^2(p^2 + q^2) = (a^2 - cq - dp)^2$

(c) $a^2(p^2 + q^2) = (b^2 - cp - dq)^2$

(d) None of these