# MATHEMATICS LECTURES FOR IIT-JEE BY MANISH KALIA

## Circle

### JEE-MAINS (PREVIOUS YEAR)

**MCQ Single Correct**

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

(1) $2\left(\sqrt{2}+1\right)$ (2) $2\left(\sqrt{2}-1\right)$

(3) $4\left(\sqrt{2}-1\right)$ (4) $4\left(\sqrt{2}+1\right)$ **[2017]**

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

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

(3) 10 (4) $5\sqrt{2}$ **[2016]**

3. 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 :

(1) 2 (2) 3

(3) 4 (4) 1 **[2015]**

4. 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

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

(3) $\frac{1}{2}$ (4) $\frac{1}{4}$ **[2014]**

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

(1) $(2,-5)$ (2) $(5,-2)$

(3) $(-2,5)$ (4) $(-5,2)$ **[2013]**

6. 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)

(1) 6/5 (2) 5/3

(3) 10/3 (4) 3/5 **[2012]**

7. The equation of the circle passing through the points (1,0) and (0,1) and having the smallest radius is

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

(3) $x^2+y^2-2x-2y+1=0$ (4) $x^2+y^2-x-y=0$ **[2011]**

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

(1) $-35<m<15$ (2) $15<m<65$

(3) $35<m<85$ (4) $-85<m<-35$ **[2010]**

9. 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

(1) all values of p (2) all except one value of p

(3) all except two values of p (4) exactly one value of p **[2009]**

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

(1) (3,-4) (2) (-3,4)

(3) (-3,-4) (4) (3,4) **[2008]**

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

(1) $0<k<1/2$ (2) $k\geq 1/2$

(3) $-1/2\leq k\leq 1/2$ (4) $k\leq 1/2$ **[2007]**

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

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

(3) $x^2+y^2-2x+2y-62=0$ (4) $x^2+y^2-2x+2y-47=0$ **[2006]**

13. 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

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

(3) $x^2+y^2=\frac{27}{4}$ (4) $x^2+y^2=\frac{9}{4}$ **[2006]**

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

(1) exactly one value of a (2) no value of a

(3) infinitely many values of a (4) exactly two values of a **[2005]**

15. 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

(1) an ellipse (2) a circle

(3) a hyperbola (4) a parabola **[2005]**

16. 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 **[2005]**

(1) $x^2+y^2-3ax-4by+\left(a^2+b^2-p^2\right)=0$ (2) $2ax+2by-\left(a^2-b^2+p^2\right)=0$

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

17. 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 **[2004]**

(1) $2ax+2by+\left(a^2+b^2+4\right)=0$ (2) $2ax+2by-\left(a^2+b^2+4\right)=0$

(3) $2ax-2by+\left(a^2+b^2+4\right)=0$ (4) $2ax-2by-\left(a^2+b^2+4\right)=0$

18. 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

(1) $\left(x-p\right)^2=4qy$ (2) $\left(x-q\right)^2=4py$

(3) $\left(y-p\right)^2=4qx$ (4) $\left(y-q\right)^2=4px$ **[2004]**

19. If the lines $2x+3y+1=0$ and $3x-y-4=0$ lie along diameters of a circle of circumference $10\pi$, then the equation of the circle is

(1) $x^2+y^2-2x+2y-23=0$ (2) $x^2+y^2-2x-2y-23=0$

(3) $x^2+y^2+2x+2y-23=0$ (4) $x^2+y^2+2x-2y-23=0$ **[2004]**

20. The 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

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

(3) $x^2+y^2+x+y=0$ (4) $x^2+y^2+x-y=0$ **[2004]**

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

(1) $2<r<8$ (2) $r<2$

(3) r = 2 (4) $r>2$ **[2003]**

22. 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

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

(3) $x^2+y^2-2x+2y=47$ (4) $x^2+y^2-2x+2y=62$ **[2003]**

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

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

(3) $-1\pm\sqrt{2}$ (4) none of these **[2002]**

24. 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

(1) $4\le x^2+y^2\le 64$ (2) $x^2+y^2\le 25$

(3) $x^2+y^2\ge 25$ (4) $3\le x^2+y^2\le 9$ **[2002]**

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

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

(3) $\left(\frac{3}{2},\frac{1}{2}\right)$ (4) $\left(\frac{1}{2},\frac{3}{2}\right)$ **[2002]**

26. The equation of a circle with origin as a centre and passing through equilateral triangle whose median is of length 3a is

(1) $x^2+y^2=9a^2$ (2) $x^2+y^2=16a^2$

(3) $x^2+y^2=4a^2$ (4) $x^2+y^2=a^2$ **[2002]**