



Max Marks: 100

Date: 06.11.2022

**ARJUNA BATCH**  
**MATHEMATICS : REVISION TEST-1 (SET B)**  
**Topic: Trigonometry II + Straight Lines + Circle**

1. The centre of the circle circumscribing the square whose four sides are  $3x + y = 22$ ,  $x - 3y = 14$ ,  $3x + y = 62$  and  $x - 3y = 4$  is  
 (a)  $\left(\frac{3}{2}, \frac{27}{2}\right)$  (b)  $\left(\frac{27}{2}, \frac{3}{2}\right)$  (c)  $(27, 3)$  (d)  $\left(1, \frac{2}{3}\right)$
2. If the circles  $x^2 + y^2 - 6x - 8y + c = 0$  and  $x^2 + y^2 = 9$  have three common tangents then  $c =$   
 (a) 18 (b) 19 (c) 20 (d) 21
3. The maximum value of  $(\cos \alpha_1)(\cos \alpha_2) \dots (\cos \alpha_n)$  under the condition  $0 \leq \alpha_1, \alpha_2, \dots, \alpha_n \leq \frac{\pi}{2}$  and  $(\cos \alpha_1)(\cot \alpha_2) \dots (\cot \alpha_n) = 1$  is  
 (a)  $\frac{1}{2^{n/2}}$  (b)  $\frac{1}{2^n}$  (c)  $-\frac{1}{2^n}$  (d) 1
4. A straight rod of length 9 units slides with its ends A, B always on the X and Y axis respectively. Then the locus of the centroid of the triangle OAB is  
 (a)  $x^2 + y^2 = 3$  (b)  $x^2 + y^2 = 9$  (c)  $x^2 + y^2 = 1$  (d)  $x^2 + y^2 = 81$
5. A(-1, 1), B(5, 3) are opposite vertices of a square. The equation of the other diagonal (not passing through A, B) of the square is  
 (a)  $2x - 3y + 4 = 0$  (b)  $2x - y + 3 = 0$  (c)  $y + 3x - 8 = 0$  (d)  $x + 2y - 1 = 0$
6. If  $p_n = \cos^n \theta + \sin^n \theta$ , then  $2p_6 - 3p_4 + 1 =$   
 (a) 2 (b) 3 (c) 0 (d) 1
7. A circle passes through the origin and has its centre on  $y = x$ . If it cuts  $x^2 + y^2 - 4x - 6y + 10 = 0$  orthogonally, its equation is  
 (a)  $x^2 + y^2 - x - y = 0$  (b)  $x^2 + y^2 - 6x + 4y = 0$   
 (c)  $x^2 + y^2 - 2x - 2y = 0$  (d)  $x^2 + y^2 + 2x + 2y = 0$

**Space for Rough Work**



8. The general solution of  $\tan \theta = \frac{1}{\sqrt{3}}$  and  $\cos \theta = \frac{-\sqrt{3}}{2}$  is  $\theta =$
- (a)  $n\pi + \frac{7\pi}{6}$  (b)  $2n\pi + \frac{\pi}{2}$  (c)  $2n\pi + \frac{7\pi}{6}$  (d)  $n\pi + \frac{\pi}{6}$
9. The equation of the circle touching the y-axis at the origin and passing through (b, c) is
- (a)  $b(x^2 - y^2) = x(b^2 - c^2)$  (b)  $b(x^2 - y^2) = x(b^2 + c^2)$   
(c)  $b(x^2 + y^2) = x(b^2 + c^2)$  (d)  $b(x^2 + y^2) = x(b^2 - c^2)$
10. If  $\cot \theta + \tan \theta = 2 \operatorname{cosec} \theta$  then the general value of  $\theta =$
- (a)  $2n\pi \pm \frac{\pi}{3}$  (b)  $2n\pi \pm \frac{\pi}{6}$  (c)  $n\pi \pm \frac{\pi}{3}$  (d)  $n\pi \pm \frac{\pi}{6}$
11. The general solution of  $\operatorname{cosec}^2 \theta = \frac{4}{3}$  is  $\theta =$
- (a)  $n\pi \pm \frac{\pi}{4}$  (b)  $n\pi \pm \frac{\pi}{3}$  (c)  $n\pi \pm \frac{\pi}{6}$  (d)  $n\pi \pm \frac{\pi}{2}$
12. If  $\tan 25^\circ = x$  then  $\frac{\tan 155^\circ - \tan 115^\circ}{1 + \tan 155^\circ \cdot \tan 115^\circ} =$
- (a)  $\frac{1+x^2}{2x}$  (b)  $\frac{1+x^2}{1-x^2}$  (c)  $\frac{1-x^2}{2x}$  (d)  $\frac{1-x^2}{1+x^2}$
13. The general solution of  $x$  satisfying  $\sin^2 x \cdot \sec x + \sqrt{3} \tan x = 0$  is given by
- (a)  $x = \frac{n\pi}{2}$  (b)  $x = \frac{n\pi}{3}$  (c)  $x = n\pi$  (d)  $x = 2n\pi$
14. The angles between the lines  $2x - y + 3 = 0$  and  $x + 2y + 3 = 0$  is
- (a)  $90^\circ$  (b)  $60^\circ$  (c)  $45^\circ$  (d)  $30^\circ$
15. A circle having  $2x + 3y - 5 = 0$  as a diameter cuts  $x^2 + y^2 + 2x + 17y + 5 = 0$  and  $x^2 + y^2 + 7x + 6y + 11 = 0$  orthogonally. Then its centre is
- (a)  $(4, -1)$  (b)  $(-5, 5)$  (c)  $(1, -1)$  (d)  $(1, 1)$

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**Space for Rough Work**



16. If  $a \cos \theta + b \sin \theta = p$  and  $a \sin \theta - b \cos \theta = q$  then  
 (a)  $a^2 - b^2 = p^2 - q^2$  (b)  $a^2 + b^2 = p^2 + q^2$  (c)  $a + b = p + q$  (d)  $a - b = p - q$
17. A circle of radius 2 units lies in the first quadrant touching both the axes. Then the equation of the circle with centre (6, 5) and touching the above circle externally is  
 (a)  $x^2 + y^2 - 12x - 10y + 12 = 0$  (b)  $x^2 + y^2 - 12x - 10y + 32 = 0$   
 (c)  $x^2 + y^2 - 12x - 10y + 52 = 0$  (d)  $x^2 + y^2 - 12x - 10y + 10 = 0$
18. The orthocentre of the triangle formed by A(1, 2), B(-2, 2), C(1, 5) is  
 (a) (1, 5) (b) (-2, 2) (c) (0, 3) (d) (1, 2)
19. The line  $y = x + 3$  meets the circle  $x^2 + y^2 = a^2$  at A and B then the equation of the circle on AB as diameter is  
 (a)  $x^2 + y^2 + 3x - 3y - a^2 + 9 = 0$  (b)  $x^2 + y^2 + 3x + 3y - a^2 + 9 = 0$   
 (c)  $x^2 + y^2 - 3x + 3y - a^2 + 9 = 0$  (d)  $x^2 + y^2 - 3x - 3y - a^2 + 9 = 0$
20. The length of the chord joining the points  $(4 \cos \theta, 4 \sin \theta)$  and  $(4 \cos (\theta + 60^\circ), 4 \sin (\theta + 60^\circ))$  of the circle  $x^2 + y^2 = 16$  is  
 (a) 16 (b) 2 (c) 4 (d) 8
21. If (-2, 6) is the image of the point (4, 2) with respect to the line  $L = 0$ , then  $L =$   
 (a)  $3x - 2y + 5$  (b)  $3x - 2y + 10$  (c)  $2x + 2y - 5$  (d)  $6x - 4y - 7$
22. If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$  then  $\cos \theta - \sin \theta =$   
 (a)  $\sqrt{2} \cos \theta$  (b)  $\sqrt{2} \sin \theta$  (c)  $-\sqrt{2} \cos \theta$  (d)  $-\sqrt{2} \sin \theta$
23. A line meets the coordinate axes in A and B. A circle is circumscribed about the triangle OAB. If m and n are distances of tangent to circle at origin from the points A and B respectively then diameter of the circle is  
 (a)  $m + n$  (b)  $m - n$  (c)  $mn$  (d)  $m/n$
24. The length of the common chord of two circles of radii 15 and 20 and whose centres are 25 units apart is  
 (a) 24 (b) 25 (c) 15 (d) 20

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**Space for Rough Work**



25. If  $(\sin \alpha + \operatorname{cosec} \alpha)^2 + (\sec \alpha + \cos \alpha)^2 = k + \tan^2 \alpha + \cos^2 \alpha$  then  $k =$   
 (a) 9 (b) 7 (c) 5 (d) 3
26. If the coordinates of the middle point of the portion of a line intercepted between the coordinates axes is  $(3, 2)$ , then the equation of the line will be  
 (a)  $2x + 3y = 12$  (b)  $3x + 2y = 12$  (c)  $4x - 3y = 12$  (d)  $5x - 2y = 10$
27. The greatest distance of the point  $(10, 7)$  from the circle  $x^2 + y^2 - 4x - 2y - 20 = 0$  is  
 (a) 10 (b) 15 (c) 5 (d) 0
28. The midpoint of  $(-5, 12)$  and  $(9, -2)$  divides the join of the points  $(-8, -5)$ ,  $(7, 10)$  in the ratio  
 (a)  $2 : 1$  (b)  $3 : 2$  (c)  $1 : 3$  (d)  $4 : 3$
29. If  $A(2, -1)$  and  $B(6, 5)$  are two points. The ratio in which the foot of the perpendicular from  $(4, 1)$  to  $AB$  divides it is  
 (a)  $8 : 15$  (b)  $5 : 8$  (c)  $-5 : 8$  (d)  $-8 : 5$
30. The value of  $\cos \frac{\pi}{7} + \cos \frac{2\pi}{7} + \cos \frac{3\pi}{7} + \cos \frac{4\pi}{7} + \cos \frac{5\pi}{7} + \cos \frac{6\pi}{7} + \cos \frac{7\pi}{7}$  is  
 (a) 1 (b) -1 (c) 0 (d) None of these
31. The angle between the tangents from the origin to the circle  $(x - 7)^2 + (y + 1)^2 = 25$  is  
 (a)  $\frac{\pi}{3}$  (b)  $\frac{\pi}{6}$  (c)  $\frac{\pi}{2}$  (d)  $\frac{\pi}{8}$
32. A straight line is such that its distance of 5 units from the origin and its inclination is  $135^\circ$ , the intercepts of the line on the co-ordinate axes are  
 (a) 5, 5 (b)  $\sqrt{2}, \sqrt{2}$  (c)  $5\sqrt{2}, 5\sqrt{2}$  (d)  $\frac{5}{\sqrt{2}}, \frac{5}{\sqrt{2}}$
33. The chord of contact of the pair of tangents drawn from each point on the line  $2x + y = 4$  to the circle  $x^2 + y^2 = 1$  passes through the point  
 (a)  $(1, 2)$  (b)  $\left(\frac{1}{2}, \frac{1}{4}\right)$  (c)  $(2, 4)$  (d) None of these

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**Space for Rough Work**



34. The vertices of a triangle are (2, 1), (5, 2) and (3, 4) respectively, then the circumcentre is  
 (a)  $\left(\frac{13}{4}, \frac{-9}{4}\right)$  (b)  $\left(\frac{-13}{4}, \frac{9}{4}\right)$  (c)  $\left(\frac{-13}{4}, \frac{-9}{4}\right)$  (d)  $\left(\frac{13}{4}, \frac{9}{4}\right)$
35. The equation  $k \cos x - 3 \sin x = k + 1$  is solvable only if  $k$  belongs to the interval  
 (a)  $[4, \infty)$  (b)  $[-4, 4]$  (c)  $(-\infty, 4]$  (d)  $(-\infty, 4)$
36. If  $2x + y - 4 = 0$  is a bisector of angles between the lines  $a(x - 1) + b(y - 2) = 0$ ,  $c(x - 1) + d(y - 2) = 0$  the other angular bisector is  
 (a)  $x - 2y + 1 = 0$  (b)  $x - 2y - 3 = 0$  (c)  $x - 2y + 3 = 0$  (d)  $x + 2y - 5 = 0$
37. The transformed equation of  $x^2 + 6xy + 8y^2 = 10$  when the axes are rotated through an angle  $\frac{\pi}{4}$  is  
 (a)  $15x^2 - 14xy + 3y^2 = 20$  (b)  $15x^2 + 14xy - 3y^2 = 20$   
 (c)  $15x^2 + 14xy + 3y^2 = 20$  (d)  $15x^2 - 14xy - 3y^2 = 20$
38. The points (0, 0), (1, 0), (0, 1) and (t, t) are concyclic then  $t =$   
 (a)  $-1$  (b)  $1$  (c)  $2$  (d)  $-2$
39. Given that for the circle  $x^2 - y^2 - 4x + 6y + 1 = 0$  the line with equation  $3x - y = 1$  is a chord. The midpoint of the chord is  
 (a)  $\left(\frac{2}{5}, \frac{11}{5}\right)$  (b)  $\left(-\frac{2}{5}, \frac{11}{5}\right)$  (c)  $\left(-\frac{2}{5}, -\frac{11}{5}\right)$  (d)  $\left(\frac{2}{5}, -\frac{11}{5}\right)$
40. The common chord of  $x^2 + y^2 = 16$  and  $x^2 + y^2 - 4x - 4y = 0$  subtends at the origin an angle equal to  
 (a)  $\frac{\pi}{6}$  (b)  $\frac{\pi}{4}$  (c)  $\frac{\pi}{3}$  (d)  $\frac{\pi}{2}$
41. In a  $\Delta PQR$ , if  $3 \sin P + 4 \cos Q = 6$  and  $4 \sin Q + 3 \cos P = 1$ , then the angle  $R$  is equal to  
 (a)  $\frac{5\pi}{6}$  (b)  $\frac{\pi}{6}$  (c)  $\frac{\pi}{4}$  (d)  $\frac{3\pi}{4}$
42. If (3, -2) is the midpoint of the chord AB of the circle  $x^2 + y^2 - 4x + 6y - 5 = 0$  then  $AB =$   
 (a) 4 (b) 8 (c) 12 (d) 16

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**Space for Rough Work**



43.  $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 85^\circ$   
 (a)  $7\frac{1}{2}$  (b)  $8\frac{1}{2}$  (c) 9 (d)  $9\frac{1}{2}$
44. The line  $y = x + a\sqrt{2}$  touches the circle  $x^2 + y^2 = a^2$  at the point  
 (a)  $\left(-\frac{a}{\sqrt{2}}, \frac{a}{\sqrt{2}}\right)$  (b)  $\left(\frac{a}{\sqrt{2}}, \frac{a}{\sqrt{2}}\right)$  (c)  $\left(\frac{a}{\sqrt{2}}, -\frac{a}{\sqrt{2}}\right)$  (d)  $\left(-\frac{a}{\sqrt{2}}, -\frac{a}{\sqrt{2}}\right)$
45. The area of the parallelogram formed by the lines  $2x - 3y + a = 0$ ,  $3x - 2y - a = 0$ ,  $2x - 3y + 3a = 0$  and  $3x - 2y - 2a = 0$  in square units, is  
 (a)  $\frac{a^2}{5}$  (b)  $\frac{2a^2}{5}$  (c)  $\frac{3a^2}{5}$  (d) None of these
46. The distance of the point (2, 3) from the line  $2x - 3y + 9 = 0$  measured along the line  $x - y + 1 = 0$  is  
 (a)  $4\sqrt{2}$  (b)  $2\sqrt{2}$  (c)  $\sqrt{2}$  (d)  $1/\sqrt{2}$
47. If the distance between the points  $P(a \cos 48^\circ, 0)$  and  $Q(0, a \cos 12^\circ)$  is  $d$ , then  $d^2 - a^2 =$   
 (a)  $\frac{a^2}{4}(\sqrt{5} - 1)$  (b)  $\frac{a^2}{4}(\sqrt{5} + 1)$  (c)  $\frac{a^2}{8}(\sqrt{5} - 1)$  (d)  $\frac{a^2}{8}(\sqrt{5} + 1)$
48. If  $\frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1$  and  $\frac{x}{a} \sin \theta - \frac{y}{b} \cos \theta = 1$ , then  $\frac{x^2}{a^2} + \frac{y^2}{b^2} =$   
 (a) 1 (b) -1 (c) 2 (d) 3
49. If the pair of lines  $xy - x - y + 1 = 0$  and the line  $ax + 2y - 3 = 0$  are concurrent then  $a =$   
 (a) -1 (b) 0 (c) 3 (d) 1
50. The value of  $2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) + 1$  is  
 (a) 2 (b) 0 (c) 4 (d) 6

**BJNP***Learning with the Speed of Mumbai and the Tradition of Kota***Max Marks: 100****Date: 06.11.2022**

**ARJUNA BATCH**  
**MATHEMATICS : REVISION TEST-1 (SET B) ANSWER KEY**  
**Topic: Trigonometry II + Straight Lines + Circle**

1.	(b)	2.	(d)	3.	(a)	4.	(b)	5.	(c)
6.	(c)	7.	(c)	8.	(c)	9.	(c)	10.	(a)
11.	(b)	12.	(c)	13.	(c)	14.	(a)	15.	(d)
16.	(b)	17.	(c)	18.	(d)	19.	(a)	20.	(c)
21.	(a)	22.	(b)	23.	(a)	24.	(a)	25.	(b)
26.	(a)	27.	(b)	28.	(a)	29.	(b)	30.	(b)
31.	(c)	32.	(c)	33.	(b)	34.	(d)	35.	(c)
36.	(c)	37.	(a)	38.	(b)	39.	(c)	40.	(d)
41.	(a)	42.	(b)	43.	(b)	44.	(a)	45.	(b)
46.	(a)	47.	(d)	48.	(c)	49.	(d)	50.	(b)