विद्या ददाति विनयम्
Knowledge is Discipline
BJNP
Learning with the Speed of Mumbai and the Tradition of Kota

Max Marks: 100 **Date: 20.11.2022**

ABHIMANYU BATCH
MATHEMATICS : REVISION TEST-3 (SET B)
Topic: Trigonometry II + Straight Lines + Circle + Complex Number + PnC + Probability

1. There are 20 straight lines in a plane such that no two of them are parallel and no three of them are concurrent. If their points of intersection are joined, then the number of new line segments formed are

   (a) 3420 (b) 14535 (c) 2907 (d) 17955

2. Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is

   (a) $\frac{1}{9}$ (b) $\frac{1}{18}$ (c) $\frac{1}{36}$ (d) $\frac{1}{12}$

3. If two dice are thrown simultaneously, then the probability that the sum of the numbers which come up on the dice to be more than 5 is

   (a) $\frac{5}{18}$ (b) $\frac{5}{36}$ (c) $\frac{13}{18}$ (d) $\frac{1}{6}$

4. If 3 coins were tossed, then the probability of getting 2 heads is

   (a) $\frac{3}{8}$ (b) $\frac{2}{8}$ (c) $\frac{1}{8}$ (d) none of these

5. A flashlight has 10 batteries out of which 4 are dead. If 3 batteries are selected without replacement and tested, then the probability that all 3 are dead is

   (a) $\frac{1}{30}$ (b) $\frac{2}{8}$ (c) $\frac{1}{15}$ (d) $\frac{1}{10}$

6. Two cards are drawn at random from a pack of 52 cards. Find the probability that they are both Aces if the first card is not replaced?

   (a) $\frac{1}{169}$ (b) $\frac{1}{221}$ (c) $\frac{4}{13}$ (d) $\frac{3}{13}$

Space for Rough Work

7. Letters in the word HULULULU are rearranged. The probability of all three L being together is

(a) $\frac{3}{20}$ (b) $\frac{2}{5}$ (c) $\frac{3}{28}$ (d) $\frac{5}{23}$

8. Probability of solving of sum correctly by A, B and C is $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{5}$ respectively. The probability that at least one of them solves it correctly is

(a) $\frac{11}{15}$ (b) $\frac{4}{15}$ (c) $\frac{1}{20}$ (d) $\frac{19}{20}$

9. A room contains 3 sockets for bulbs. If from a collection of 10 bulbs, out of which 6 are defective, 3 bulbs are selected at random and put in the sockets, then the probability that the room is lighted is

(a) $\frac{3}{5}$ (b) $\frac{1}{5}$ (c) $\frac{5}{6}$ (d) $\frac{1}{6}$

10. If $P(A)=\frac{4}{5}, P(B')=\frac{2}{5}, P(A\cap B)=\frac{1}{2}$, then $P(A\cap B')$ is equal to

(a) $\frac{3}{10}$ (b) $\frac{1}{5}$ (c) $\frac{4}{5}$ (d) $\frac{1}{2}$

11. If α and β are roots of the equation $x^2 + x + 1 = 0$, then $\alpha^2 + \beta^2$ is

(a) $\frac{-1+i\sqrt{3}}{2}$ (b) -1 (c) 1 (d) $\frac{-1-i\sqrt{3}}{2}$

12. If the cube roots of unity are $1, \omega, \omega^2$, then the roots of the equation $(x-2)^3 + 27 = 0$ are

(a) $-1, -1, -1$ (b) $-1, -\omega, -\omega^2$

(c) $-1, 2+3\omega, 2+3\omega^2$ (d) $-1, 2-3\omega, 2-3\omega^2$

13. If ${}^{12}P_r = 1320$, then r is equal to

(a) 5 (b) 4 (c) 3 (d) 2

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14. Using the letters of the word TRICK, a five letter word with distinct letters is formed such that C is in the middle. In how many ways this is possible?

(a) 6 (b) 120 (c) 24 (d) 72

15. The number of words that can be formed out of the letters of the word ARTICLE so that the vowels occupy even places is

(a) 36 (b) 574 (c) 144 (d) 754

16. How many 5 digit telephone numbers can be constructed using the digits 0 to 9, if each number starts with 67 and no digit appears more than once?

(a) 335 (b) 336 (c) 338 (d) 337

17. The number of 5 digit telephone number having a least one of their digits repeated is

(a) 90,000 (b) 100,000 (c) 30,240 (d) 69,760

18. The number of 4 digit number without repetition that can be formed using the digits 1, 2, 3, 4, 5, 6, 7 in which each number has two odd digits and two even digits is

(a) 436 (b) 454 (c) 432 (d) 450

19. There are 10 intermediate stations on a railway line between two particular stations. The number of ways that a train can be made to stop at 3 of these intermediate stations so that no two of these halting stations are consecutive, is

(a) 56 (b) 126 (c) 20 (d) 120

20. Everybody in a room shakes hands with everybody else. The total number of handshakes is 45. The total number of persons in the room is

(a) 9 (b) 10 (c) 5 (d) 15

21. The slope of a line that makes an angle of measure 30º with Y-axis is

(a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $\pm\sqrt{3}$ (d) $\pm\frac{1}{\sqrt{3}}$

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22. If A(5, 8), B(–3, 4) and C(7, k) are vertices of ΔABC and $m\angle B = 90^\circ$, then k =

(a) 16 (b) –12 (c) –16 (d) 12

23. A line cuts off equal intercepts on the co-ordinate axes. The angle made by this line with the positive direction of X-axis is

(a) 90° (b) 135° (c) 45° (d) 120°

24. Equation of the straight line making equal intercepts on the axes and passing through the point (2, 4) is

(a) $4x - y - 4 = 0$ (b) $2x + y - 8 = 0$ (c) $x + y - 6 = 0$ (d) $x + 2y - 10 = 0$

25. If $\left(\frac{3}{2}, \frac{5}{2}\right)$ is the midpoint of line segment intercepted by a line between axes, the equation of the line is

(a) $5x + 3y + 15 = 0$ (b) $3x + 5y + 15 = 0$ (c) $5x + 3y - 15 = 0$ (d) $3x + 5y - 15 = 0$

26. A straight line passes through the points (5, 0) and (0, 3). The length of perpendicular from the point (4, 4) on the line is

(a) $\frac{15}{\sqrt{34}}$ (b) $\frac{\sqrt{17}}{2}$ (c) $\frac{17}{2}$ (d) $\sqrt{\frac{17}{2}}$

27. The equation of a circle touching the coordinate axes and the line $3x - 4y = 12$ is

(a) $x^2 + y^2 + 6x + 6y + 9 = 0$ (b) $x^2 + y^2 + 6x + 6y - 9 = 0$

(c) $x^2 + y^2 - 6x - 6y + 9 = 0$ (d) $x^2 + y^2 - 6x - 6y + 9 = 0$

28. The sides of a rectangle are given by $x = \pm a$ and $y = \pm b$. The equation of the circle passing through the vertices of the rectangle is

(a) $x^2 + y^2 = a^2$ (b) $x^2 + y^2 = a^2 + b^2$

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

29. Equation of circle with centre (–a, –b) and radius $\sqrt{a^2 - b^2}$ is

(a) $x^2 + y^2 + 2ax + 2by + 2b^2 = 0$ (b) $x^2 + y^2 - 2ax - 2by - 2b^2 = 0$

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

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30. $x^2 + y^2 (2k - 1) xy - 2x + 4y + 3 = 0$ represents the equation of circle, find k and radius of the circle?

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

31. $x^2 + hxy + y^2 - 6x - 2y + k = 0$ is the equation of the circle and 2 is the radius of the circle, then find the values of h and k?

(a) h = 0, k = –6 (b) h = 0, k = 6 (c) h = –3, k = 6 (d) h = 3, k = 6

32. The length of the common chord of the two circles $(x - a)^2 + y^2 = a^2$ and $x^2 + (y - b)^2 = b^2$ is

(a) $\frac{ab}{\sqrt{a^2 + b^2}}$ (b) $\frac{2ab}{\sqrt{a^2 + b^2}}$ (c) $\frac{a + b}{\sqrt{a^2 + b^2}}$ (d) $\sqrt{a^2 + b^2}$

33. Le the tangents drawn from the origin to the circle, $x^2 + y^2 - 8x - 4y + 16 = 0$ touch it at the points A and B. The $(AB)^2$ is equal to

(a) $\frac{56}{5}$ (b) $\frac{64}{5}$ (c) $\frac{32}{5}$ (d) $\frac{52}{5}$

34. If the length of a the common chord of two circles $x^2 + y + 8x + 1 = 0$ and $x^2 + y^2 + 2\mu y - 1 = 0$ is $2\sqrt{6}$, then the value of μ is

(a) ±2 (b) ±3 (c) ±4 (d) none of these

35. The conjugate of $\frac{(2+i)^2}{3+i}$ in the form of a + ib is

(a) $\frac{13}{2} + i\left(\frac{15}{2}\right)$ (b) $\frac{13}{10} + i\left(\frac{-15}{2}\right)$ (c) $\frac{13}{10} + i\left(\frac{-9}{10}\right)$ (d) $\frac{13}{10} + i\left(\frac{9}{10}\right)$

36. If α is a real number such that $z - i\alpha$ is real and $z = \frac{11 - 3i}{1 + i}$, then the value of α is

(a) 4 (b) –4 (c) –7 (d) 7

37. The smallest positive integer n for which $(1 + i)^{2n} = (1 - i)^{2n}$ is

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

Space for Rough Work

38. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then the least positive integral value of m is

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

39. If $\omega = \frac{-1+\sqrt{3}i}{2}$, then $(3 + \omega + 3\omega^2)^4 =$

(a) 16 (b) –16 (c) 16 ω (d) 16 ω^2

40. If α is an imaginary cube root of unity, then for $n \in N$, the value of $\alpha^{3n+1} + \alpha^{3n+3} + \alpha^{3n+5}$ is

(a) –1 (b) 0 (c) 1 (d) 3

41. The value of tan (–945°) is

(a) –1 (b) –2 (c) –3 (d) –4

42. $\tan\theta \sin\left(\frac{\pi}{2}+\theta\right)\cos\left(\frac{\pi}{2}-\theta\right) =$

(a) 1 (b) 0 (c) $\cos^2\theta$ (d) $\sin^2\theta$

43. $\sin(\pi + \theta) \sin(\pi - \theta) \operatorname{cosec}^2\theta =$

(a) 1 (b) –1 (c) $\sin\theta$ (d) $-\sin\theta$

44. $\cos A + \sin(270° + A) - \sin(270° - A) + \cos(180° + A) =$

(a) –1 (b) 0 (c) 1 (d) 1/2

45. If $\sin A = \frac{4}{5}$ and $\cos B = -\frac{12}{13}$, where A and B lie in first and third quadrant respectively, then $\cos(A + B) =$

(a) $\frac{56}{65}$ (b) $-\frac{56}{65}$ (c) $\frac{16}{65}$ (d) $-\frac{16}{65}$

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46. If $\cos\theta = \frac{8}{17}$ and θ lies in the 1st quadrant, then the value of $\cos(30^\circ + \theta) + \cos(45^\circ - \theta) + \cos(120^\circ - \theta)$ is

(a) $\frac{23}{17}\left(\frac{\sqrt{3}-1}{2} + \frac{1}{\sqrt{2}}\right)$ (b) $\frac{23}{17}\left(\frac{\sqrt{3}+1}{2} + \frac{1}{\sqrt{2}}\right)$

(c) $\frac{23}{17}\left(\frac{\sqrt{3}-1}{2} - \frac{1}{\sqrt{2}}\right)$ (d) $\frac{23}{17}\left(\frac{\sqrt{3}+1}{2} - \frac{1}{\sqrt{2}}\right)$

47. If $\sin\theta = \frac{12}{13}, \left(0 < \theta < \frac{\pi}{2}\right)$ and $\cos\phi = -\frac{3}{5}, \left(\pi < \phi < \frac{3\pi}{2}\right)$, then $\sin(\theta + \phi)$ will be

(a) $\frac{-56}{61}$ (b) $\frac{-56}{65}$ (c) $\frac{1}{65}$ (d) -56

48. If $\frac{\pi}{2} < \alpha < \pi$, $\pi < \beta < \frac{3\pi}{2}$; $\sin\alpha = \frac{15}{17}$ and $\tan\beta = \frac{12}{5}$, then the value of $\sin(\beta - \alpha)$ is

(a) $\frac{-171}{221}$ (b) $\frac{-21}{221}$ (c) $\frac{21}{221}$ (d) $\frac{171}{221}$

49. If the distance of any point P from the points A(a + b, a – b) and B(a – b, a + b) are equal, then the locus of P is

(a) $x - y = 0$ (b) $ax + by = 0$ (c) $bx - ay = 0$ (d) $x + y = 0$

50. What is the equation of the locus of a point which moves such that 4 times its distance from the X-axis is the square of its distance from the origin?

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

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Topic: Trigonometry II + Straight Lines + Circle + Complex Number + PnC + Probability

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