

Instructions : 1. The question paper has five parts namely A, B, C, D and E. Answer all the Parts.

2. Part A has 15 multiple choice questions, 5 fill in the blank questions

PART -A

- I. Answer all the multiple choice questions : 15 x 1 = 15**
1. The interval form of $\{x : x \in \mathbb{R}, -4 < x \leq 6\}$ is
 a) $[-4, 6]$ b) $(-4, 6]$ c) $(-4, 6)$ d) $[-4, 6)$
 2. If $(x + 1, y - 2) = (3, 1)$ then
 a) $x = 2, y = 3$ b) $x = 2, y = -3$ c) $x = -2, y = 3$ d) $x = 2, y = -1$
 3. The degree measure of $\frac{5\pi}{3}$ radians is equal to
 a) 225° b) 300° c) 420° d) 135°
 4. The conjugate of $i - 2$ is
 a) $i + 2$ b) $-2 + i$ c) $-2 - i$ d) $-i + 2$
 5. $a > b$ implies
 a) $-a < -b$ b) $-a > b$ c) $-a < b$ d) $a < -b$
 6. If $n_{C_9} = n_{C_8}$, then $n_{C_{17}}$ is
 a) 1 b) 17 c) 7 d) 10
 7. The number of terms in the expansion of $(a + b)^6$ is
 a) 6 b) 5 c) 7 d) 8
 8. If a sequence is defined as $a_n = 2n + 5$, then the first term is
 a) 5 b) 6 c) 7 d) 8
 9. The equation of x - axis is
 a) $x = 0$ b) $y = 0$ c) $xy = 0$ d) $x = y$
 10. The centre of the circle $(x + 2)^2 + (x - 3)^2 = 16$ is
 a) $(2, 3)$ b) $(-2, 3)$
 c) $(-2, -3)$ d) $(2, -3)$
 11. The length of transverse axis of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$ is
 a) 4 b) 6 c) 9 d) 16
 12. The octant in which the point $(-3, 1, 2)$ lies is
 a) First b) second c) third d) fourth
 13. The derivative of $2x - \frac{3}{4}$ with respect to x is
 a) 2 b) $\frac{3}{4}$ c) -2 d) 0
 14. The Median of the data 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21 is
 a) 18 b) 9 c) 12 d) 10
 15. The probability of drawing a diamond card from a well shuffled deck of 52 cards is
 a) $\frac{1}{4}$ b) $\frac{1}{52}$ c) $\frac{1}{13}$ d) $\frac{1}{2}$

42. Find the derivative of $\sin x$ with respect to x from first principle.

PART – D

Answer any four questions

4 x 5 =20

43. Define Greatest integer function, draw the graph . write the domain and range

44. Prove that $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

45. Find the number of arrangements of the letters of the word INDEPENDENCE.

In how many of these arrangements,

1) do the words start with P ? 2) do the words begin with I and end in P ?

46. Prove that for every positive integer n

$$(a + b)^n = n_{c_0} a^n + n_{c_1} a^{n-1} b + n_{c_2} a^{n-2} b^2 + \dots + n_{c_{n-1}} a b^{n-1} + n_{c_n} b^n$$

47. Derive the formula to find the distance of a point P (x_1, y_1) from the line $Ax + By + C = 0$

48. Prove geometrically that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$, x being measured in radians

49. Find mean deviation about the mean for the following data

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

50. A bag contains 9 discs of which 4 are red, 3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it will be i) red, ii) yellow , iii) blue, iv) not blue,

PART –E

Answer the following questions

51. Prove geometrically that $\cos (x + y) = \cos x \cos y - \sin x \sin y$

6

OR

Derive the equation of ellipse in the standard form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

52. Find the sum of the sequence 7, 77, 777, 7777, - - - - - to n terms

4

OR

Find the derivative of $\frac{x^5 - \cos x}{\sin x}$ with respect to x

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