

## GUESS PAPER-4

### MATHS - 2A Aimstutorial.in

#### SECTION - A

**I. Answer ALL the following Very Short Answer Questions:**

**[10 x 2 = 20]**

1. Write the conjugate of  $(3 + 4i)(2 - 3i)$ .
2. If  $z_1 = 1$ ,  $z_2 = i$  then find  $\text{Arg}\left(\frac{z_1}{z_2}\right)$ .
3. If  $x = \cos\theta + i\sin\theta$ , then find  $x^6 + \frac{1}{x^6}$ .
4. Find the maximum or minimum value of  $x^2 - x + 7$ .
5. Find the monomic polynomial equation of the degree 3 whose roots are 2, 3, and 6.
6. Find the number of permutations that can be made by using all the letters of the word "INTERMEDIATE".
7. If  ${}^nC_5 = {}^nC_6$  then find  ${}^{13}C_n$ .
8. Find the number of terms in the expansion of  $(2x + 3y + z)^7$ .
9. Find the mean deviation about mean for the data 3, 6, 10, 4, 9, 10.
10. A Poisson variable satisfies  $P(x = 1) = P(x = 2)$ , find  $P(X = 5)$ .

#### SECTION - B

**II. Answer any FIVE of the following Short Answer Questions:**

**[5 x 4 = 20]**

11. Show that the four points in the Argand plane represented by the complex numbers  $2 + i$ ,  $4 + 3i$ ,  $2 + 5i$ ,  $3i$  are the vertices of a square.
12. Find the maximum value of the function  $\frac{x^2 + 14x + 9}{x^2 + 2x + 3}$  over  $\mathbb{R}$ .
13. Find the sum of all 4 digit numbers that can be formed using the digits 1,3,5,7,9.
14. Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers such that there will be atleast 5 bowlers in the team.
15. Resolve  $\frac{3x + 7}{x^2 - 3x + 2}$  into partial fractions.
16. Suppose A and B are independent events with  $P(A) = 0.6$ ,  $P(B) = 0.7$  compute (i)  $P(A \cap B)$  ii)  $P(A \cup B)$  iii)  $P(A/B)$  iv)  $P(A^c \cap B^c)$ .
17. A, B, C are the three horses in a race. The probability of A to win the race is twice that of B, and probability of B is twice that of C. What are the probabilities of A, B and C to win the race?

**SECTION - C**

**III. Answer any FIVE of the following Long Answer Questions. :**

**[5 x 7 = 35]**

18. If  $n$  is a positive integer then show that  $(1 + i)^n + (1 - i)^n = 2^{(n+2)/2} \cos (n\pi/4)$ .

19. Solve the equation  $x^4 + 2x^3 - 5x^2 + 6x + 2 = 0$  given that  $1 + i$  is one of its roots.

20. If  $C_r$  denotes  ${}^nC_r$  prove that  $C_0 + C_1 \frac{x}{2} + C_2 \frac{x^2}{3} + \dots + C_n \frac{x^n}{n+1} = \frac{(1+x)^{n+1} - 1}{(n+1)x}$ .

21. If  $x = \frac{1}{5} + \frac{1.3}{5.10} + \frac{1.3.5}{5.10.15} + \dots + \infty$ , then find  $3x^2 + 6x$ .

22. Find the mean deviation about median for the following data

$x_i$	6	9	3	12	15	13	21	22
$f_i$	4	5	3	2	5	4	4	3

23. State and prove addition theorem on Probability.

24. A random variable  $X$  has the following probability distribution

$X = x_i$	1	2	3	4	5
$P(X = x_i)$	$k$	$2k$	$2k$	$3k$	$5k$

Find the value of  $k$  and the mean and variance of  $X$ .

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