

## GUESS PAPER-3

### MATHS - 2A Aimstutorial.in

#### SECTION - A

I. Answer ALL the following Very Short Answer Questions:

[10 x 2 = 20]

- Find the multiplicative inverse of  $7 + 24i$ .
- If  $z_1 = 1$ ,  $z_2 = i$  then find  $\text{Arg}\left(\frac{z_1}{z_2}\right)$ .
- If  $1, \omega, \omega^2$  are the cube roots of unity, find  $(1 - \omega + \omega^2)^6 (1 + \omega^2 + \omega)^6 = 128$ .
- If  $\alpha, \beta$  are the roots of the equation  $ax^2 + bx + c = 0$ , then find the value of  $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$  in terms of  $a, b, c$ .
- If the product of the roots of  $4x^3 + 16x^2 - 9x - a = 0$  is 9, then find  $a$ .
- Find the number of ways of preparing a chain with 6 different coloured beads.
- If  ${}^{12}C_{r+1} = {}^{12}C_{3r-5}$  find  $r$ .
- Find the set of 'x' for which the binomial expansion of  $(2 + 3x)^{2/3}$  is valid.
- Define the "Range" for an ungrouped data and also find the range of the given data:  
38, 70, 48, 40, 42, 55, 63, 46, 54, 44.
- The probability that a person chosen at random is left-handed (in handwriting) is 0.1. What is the probability that in a group of 10 people, there is one who is left handed?

#### SECTION - B

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

[5 x 4 = 20]

- Show that the points in the Argand plane represented by the complex number  $-2 + 7i, -\frac{3}{2} + \frac{1}{2}i, 4 - 3i, \frac{7}{2}(1 + i)$  are the vertices of a Rhombus.
- If  $x$  is real, prove that  $\frac{1}{3x+1} + \frac{1}{x+1} - \frac{1}{(3x+1)(x+1)}$  does not lie between 1 and 4, if  $x$  is real.
- If the letters of the word 'MASTER' are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word "MASTER".
- A candidate is required to answer 6 out of 10 questions which are divided into two groups A and B each containing 5 questions. He is not permitted to attempt more than 4 questions from either group. Find the number of different ways in which the candidate can choose six questions.
- Resolve  $\frac{x^4}{(x-1)(x-2)}$  into Partial fractions.
- In a committee of 25 members, each member is proficient either in mathematics or in statistics or in both. If 19 of these are proficient in mathematics, 16 in statistics, find the probability that a person selected from the committee is proficient in both.
- A speaks truth in 75% of the cases and B in 80% of the cases. What is the probability that their statements about an incident do not match.

**SECTION - C**

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

**[5 x 7 = 35]**

18. Show that one value of  $\left( \frac{1 + \sin \frac{\pi}{8} + i \cos \frac{\pi}{8}}{1 + \sin \frac{\pi}{8} - i \cos \frac{\pi}{8}} \right)^{8/3} = -1$ .

19. Find the polynomial equation whose roots are the translates of the roots of the equation  $x^5 - 4x^4 + 3x^2 - 4x + 6 = 0$  by  $-3$ .

20. If the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> terms in the expansion of  $(a + x)^n$  are respectively 240, 720 and 1080, then find the value of  $a$ ,  $x$  and  $n$ .

21. If  $x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \frac{1.3.5.7}{3.6.9.12} + \dots$  then prove that  $9x^2 + 2x = 11$ .

22. Find the mean deviation from the mean for the following data, using step.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	3

23. State and prove Baye's theorem.

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

$X = x_i$	0	1	2	3	4	5	6	7
$P(X = x_i)$	0	$k$	$2k$	$2k$	$3k$	$k^2$	$2k^2$	$7k^2+k$

Find : (i)  $k$  (ii) the mean (iii)  $P(0 < X < 5)$ .

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