

## GUESS PAPER - 6

### MATHS - 2A Aimstutorial.in

#### SECTION - A

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

**[10 x 2 = 20]**

1. Write the complex number  $(1 + 2i)^3$  in the form of  $a + ib$ .
2. If  $(a + ib)^2 = x + iy$ , find  $(x^2 + y^2)$ .
3. If  $1, \omega, \omega^2$  are the cube roots of unity, find  $(1 - \omega)(1 - \omega^2)(1 - \omega^4)(1 - \omega^8)$ .
4. Find the maximum or minimum value of  $x^2 - x + 7$ .
5. Find the polynomial equation whose roots are the reciprocals of roots of  $x^4 - 3x^3 + 7x^2 + 5x - 2 = 0$ .
6. Find the number of ways of preparing a chain with 6 different coloured beads.
7. If  ${}^{12}C_{r+1} = {}^{12}C_{3r-5}$  find  $r$ .
8. Find the set of 'x' for which the binomial expansion of  $(2 + 3x)^{28}$  is valid.
9. 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.
10. On an average rain falls on 12 days in every 30 days, find the probability that, rain will fall on just 3 days of a given week.

#### SECTION - B

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

**[5 x 4 = 20]**

11. If  $z = 2 - i\sqrt{7}$ , then show that  $3z^3 - 4z^2 + z + 88 = 0$ .
12. Find the range of  $\frac{(x-1)(x+2)}{x+3}$ .
13. If the letters of the word 'PRISON' are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word "PRISON".
14. Simplify  ${}^{34}C_5 + \sum_{r=0}^4 {}^{(38-r)}C_4$ .
15. Resolve  $\frac{x^2}{(x-1)(x-2)}$  into Partial fractions.
16. If A and B are independent events with  $P(A) = 0.2$ ,  $P(B) = 0.5$ , then find  
i)  $P(A/B)$                       ii)  $P(B/A)$                       iii)  $P(A \cap B)$                       iv)  $P(A \cup B)$
17. A, B, C are the three news papers published from a city. 20% of the population read A, 16% read B, 14% read C, 8% read both A and B, 5% read both A and C, 4% read both B and C and 2% all the three. Find the percentage of the population who read atleast one news paper.

**SECTION - C**

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

**[5 x 7 = 35]**

18. If  $z^2 + z + 1 = 0$ , where  $z$  is a complex number, then prove that

$$\left(z + \frac{1}{z}\right)^2 + \left(z^2 + \frac{1}{z^2}\right)^2 + \left(z^3 + \frac{1}{z^3}\right)^2 + \left(z^4 + \frac{1}{z^4}\right)^2 + \left(z^5 + \frac{1}{z^5}\right)^2 + \left(z^6 + \frac{1}{z^6}\right)^2 = 12.$$

19. Solve  $6x^6 - 25x^5 + 31x^4 - 31x^2 + 25x - 6 = 0$ .

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. Find the sum of the infinite series  $\frac{7}{5} \left( 1 + \frac{1}{10^2} + \frac{1.3}{1.2} \cdot \frac{1}{10^4} + \frac{1.3.5}{1.2.3} \cdot \frac{1}{10^6} + \dots \right)$ .

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

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of boys	6	8	14	16	4	2

23. State and prove Baye's theorem on Probability.

24. If  $X$  is a random variable with the probability distribution  $P(X = k) = \frac{(k+1)c}{2^k}$ . ( $k = 0, 1, 2, \dots$ ) then find  $c$  and  $P(1 < x < 3)$ .

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