

GUESS PAPER - 5

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. Show that complex numbers z satisfying $z^2 + \bar{z}^2 = 2$.
3. Find $\left(\frac{\sqrt{3}}{2} + \frac{i}{2}\right)^5 - \left(\frac{\sqrt{3}}{2} - \frac{i}{2}\right)^5$.
4. If the equation $x^2 - 6x + 5 = 0$ and $x^2 - 3ax + 35 = 0$ have a common root then find a .
5. If 1, 2, 3 and 4 are the roots of $x^4 + ax^3 + bx^2 + cx + d = 0$, then find the values of a , b , c and d .
6. Find the number of functions from set A containing 5 elements into a set B containing 4 elements.
7. If ${}^{12}C_{(s+1)} = {}^{12}C_{(2s-5)}$ then find s .
8. Find the coefficient of x^9 and x^{10} in the expansion of $\left(2x^2 - \frac{1}{x}\right)^{20}$.
9. Coefficient of variation of two distributions is 60 and 70 and their standard deviation are 21 and 16 respectively.
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. 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. If the expression $\frac{x-p}{x^2-3x+2}$ takes all real values for $x \in \mathbb{R}$ then find the bounds for p .
13. Find the number of ways of forming a committee of 4 members out of 6 boys and 4 girls such that there is atleast one girl in the committee.
14. A teacher wants to take 10 students to a park. He can take exactly 3 students at a time and will not take the same group of 3 students.
 - i) each student can go to the park
 - ii) the teacher can go to the park
15. Resolve $\frac{x^2-3}{(x+2)(x^2+1)}$ into partial fractions.
16. The probability for a contractor to get a road contract is $\frac{2}{3}$ and to get a building contract is $\frac{5}{9}$. the probability to get atleast one contract is $\frac{4}{5}$. Find the probability that he gets both the contracts.
17. State and prove multiplication theorem on Probability.

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. Solve $x^4 - 5x^3 + 5x^2 + 5x - 6 = 0$, given that the product of two of the roots is 3.

20. Find the numerically greatest term in the expansion of $(3x - 4y)^{14}$ when $x = 8, y = 3$.

21. If $t = \frac{4}{5} + \frac{4.6}{5.10} + \frac{4.6.8}{5.10.15} + \dots$ then prove that $9t = 16$.

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

Age (years)	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of workers (f_i)	120	125	175	160	150	140	100	30

23. Suppose that an urn B_1 contains 2 white and 3 black balls and another urn B_2 contains 3 white and 4 black balls. One urn is selected at random and a ball is drawn from it. If the ball drawn is found black find the probability that the urn chosen was B_1 .

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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