MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER 2

Section A Very Short Answer Type Questions

1. If $\left(\sqrt{3}i\right)^{100} = 2^{99}(a+ib)$. Then shot that $a^2 + b^2 = 4$

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2. If $z = 2 - 3i$, then show that $z^2 - 4z + 13 = 0$

3. If $1, w, w^2$ are the cube roots of unity, then find the value of $(1 - w + w^2)(1 + w - w^2)$.

4. If the equation $x^2 - 15 - m(2x - 8) = 0$ has equal roots, find the value of 'm'.

5. If the product of the roots of $4x^3 + 16x^2 - 9x - a = 0$ is 9 , then find a .

6. Find the number of ways of arranging the letters of the word.

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7. If $^nC_5 = (n)C_6$, then find 13_{Cn}.

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8. Find the 6th term in the expansion of

$$\left(\frac{2x}{3} + \frac{3y}{2} \right)^9$$

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

4,6,9,3,10,13,2

10. The mean and variance of a binomial distribution are 4 and 3 respectively. Fix the distribution and find $P(X \geq 1)$.

Section B Short Answer Type Questions

1. If $x + iy = \dfrac{1}{1 + \cos\theta + i\sin\theta}$, show that $4x^2 - 1 = 0$

2. If x is real, prove that $\dfrac{x}{x^2 - 5x + 9}$ lies between 1 and $\dfrac{-1}{11}$.

3. 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.

4. Simplify $^{34}C_5 + \sum\limits_{r=0}^{4} {}^{(38-r)}C_4$.

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5. Resolve $\dfrac{x^3}{(x-1)(x+2)}$ into partial fractions.

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6. A,B,C are 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 probability of A,B and C to win the race?

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7. A speaks the truth in 75% of the cases , B in 80% cases. What is the probability that their statements about an incident do not match ?

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1. If α, β are the roots of the equation $x^2 - 2x + 4 = 0$ then for any $n \in N$ show that $\alpha^n + \beta^n = 2^{n+1} \cos\left(\dfrac{n\pi}{3}\right)$.

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2. Solve $18x^3 + 81x^2 + 121x + 60 = 0$ given that one roots is equal to half the sum of the remainging roots .

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3. Prove that : If the coefficients of x^{10} in the expansion of $\left(ax^2 + \dfrac{1}{bx} \right)^{11}$ is equal to the coeffi cient of x^{-10} in the expansion of $\left(ax - \dfrac{1}{bx^2} \right)^{11}$, find the relation between a and b where a and b are real numbers.

4. If $x = \dfrac{1.3}{3.6} + \dfrac{1.3.5}{3.6.9} + \dfrac{1.3.5.7}{3.6.9.12} + \ldots.$ then prove that $9x^2 + 24x = 11$.

5. Calculate the variance and standard deviation for the following discrete frequency distribution:

x_i	4	8	11	17	20	24	32
f_i	3	5	9	5	4	3	1

6. State and explain Boyle's law.

7. The probability distribution of a random variable X is given below:

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

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

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