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MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER 5

Section A Very Short Answer Type Questions

1. Find the square root fo $(-5+12i)$

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2. If $z_1 = -1$ and $z_2 = -i$, then find Arg $(z_1 z_2)$

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3. If $x = cis\theta$, then find the value of $\left[x^6 + \frac{1}{x^6}\right]$.

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

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5. If -1,2 and α are the roots of

$2x^3 + x^2 - 7x - 6 = 0$, then find α

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6. If ${}^nP_7 = 42.\ {}^nP_5$. find n.

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7. If ${}^{17}C_{2t+1} = {}^{17}C_{3t-5}$, find t.

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8. Find the number of terms in the expansion of $(2x + 3y + z)^7$

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9. Find the mean from the mean of the following discrete data 6,7, 10,1213,4,12 ,16

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

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Sectio B Short Answer Type Questions

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

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

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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.

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

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5. Resolve the following into partial fractions.

$$\frac{2X^2 + 2x + 1}{x^3 + x^2}$$

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6. State and prove addition theorem on probability.

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7. Suppose A and B are independent events with P (A)= 0.6 P (B) = 0.7.

Compute

$P(A \cap B)$

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8. Suppose A and B are independent events with P (A) = 0.6 & P (B) = 0.7

Compute

$P(A \cup B)$

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9. Suppose A and B are independent events with P (A) = 0.6 P (B) = 0.7.

Compute

$P(B/A)$

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10. Suppose A and B are independent events with P (A)= 0.6 P (B) = 0.7.

Compute

$P(A^c \cap B^c)$

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Section C Long Answer Type Questions

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

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2. Solve the $8x^3 - 36x^2 - 18x + 81 = 0$ equation, given that the roots of each are in A.P.

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3. Prove that : If n is a positive integer and x is any nonzero real number, then prove that

$$C_0 + C_1 \frac{x}{2} + C_2 . \frac{x^2}{3} + C_3 . \frac{x^3}{4} + \ldots . + C_n . \frac{x^n}{n+1} = \frac{(1+x)^{n+1} - 1}{(n+1)x}$$

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

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5. Find the mean deviation about the median for the following continuous distribution:

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

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6. 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.

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7. A random variable X has the following probability distribution.

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

Find k

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8. A random variable X has the following probability distribution.

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

Find (i) k (ii) Mean (iii) $P(0 < X < 5)$

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9. A random variable X has the following probability distribution:

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

Find $p(0 < x < 5)$

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