MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER 4

Section A I Very Short Answer Type Questions

1. Find the complex conjugate of $(2+5i)(-4+6i)$.

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2. If $x+iy = cis\alpha . cis\beta,$ then find the valeu of x^2+y^2.

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3. If A,B,C are angles of a triangle such that $x = cisA, y = cisB, z = cisC$, then find the value of xyz .

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4. For what values of x the expression $2x^2 - 10x - 28$ is positive?

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5. If $1, 1, \alpha$ are the roots of $x^3 - 6x^2 + 9x - 4 = 0$ then find $'\alpha'$.

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6. Find the number of ways of arranging the letter of the word "MATHEMATICS".

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7. Find the value of ${}^{10}C_5 + 2.\ {}^{10}C_4 + {}^{10}C_3$.

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8. Find the 8th term of $\left(1 - \frac{5x}{2}\right)^{-3/5}$.

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9. Find the mean deviation about the mean for the following data: $3, 6, 10, 4, 9, 10$.

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10. The mean and variance of a Binomial variate are 2.4 and 1.44 respectively. Find the parameters, $P(X = 2)$ and $P(1 < X \leq 4)$.

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Section B Ii Short Answer Type Questions

1. If $(x - iy)^{1/3} = a - ib$, then show that $\frac{x}{a} + \frac{y}{b} = 4(a^2 - b^2)$.

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2. Find the maximum value of the function

$$\frac{x^2+14x+9}{x^2+2x+3}$$ over R.

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3. Find the sum of all 4- digited numbers that can be formed using the digits 1,3,5,7,9.

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4. Prove that

$$^{25}C_4+\sum_{r=0}^{4}{}^{(29-r)}C_3={}^{30}C_4$$

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5. Resolve $\frac{x^2+5x+7}{(x-3)^3}$ into partial fractions.

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6. A and B are events with $P(A)=0.5, P(B)=0.4$ and $P(A\cap B)=0.3$. Find the probability that :

A does not occur

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7. A and B are events with $P(A)=0.5, P(B)=0.4$ and $P(A\cap B)=0.3$. Find the probability that :

Neither A not B occurs.

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8. A problem in calculus is given to two students, A and B whose chances of solving it are 1/3, 1/4 respectively. Find the probability of the problem being solved if both of them try'independently.

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Section C Iii Long Answer Type Questions

1. If n is a positive integer, show that

$$(P+iQ)^{1/n}+(P-iQ)^{1/n}=2\left(P^2+Q^2\right)^{1/2n}\cos\left(\frac{1}{n},\tan.\frac{Q}{P}\right)$$

.

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2. The equation whose roots are reciprocals of the roots of $6x^6 - 25x^5 + 31x^4 - 31x^2 + 25x - 6 = 0$ ` is

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3. Prove that : For n = 0, 1, 2, 3, ..., n, prove that

$C_0 . C_r + C_1 . C_{r+1} + C_2 . C_{r+2} + ... + C_{n-r} . C_n$

$= {}^{2n}C_{(n+r)}$ and hence deduce that

Prove that : $C_0^2 + C_1^2 + C_2^2 + ... + C_n^2 = {}^{2n}C_n$

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4. Prove that : For n = 0, 1, 2, 3, ..., n, prove that

$C_0 . C_r + C_1 . C_{r+1} + C_2 . C_{r+2} + ... + C_{n-r} . C_n$

$= {}^{2n}C_{(n+r)}$ and hence deduce that

$C_0 . C_1 + C_1 . C_2 + C_2 . C_3 + ... + C_{n-1} . C_n = {}^{2n}C_{n+1}$

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5. Find the sum of the infinite series

$$\frac{7}{5}\left(1+\frac{1}{10^2}+\frac{1.3}{1.2}\cdot\frac{1}{10^4}+\frac{1.3.5}{1.2.3}\cdot\frac{1}{10^6}+\ldots.\right)$$

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6. Find the mean deviation from the mean of the following data:

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

Using step deviation method.

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7. State and prove addition theorem on probability.

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8. Find the probability of drawing and ace or a spade from a well suffled pack of 52 cards ?

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9. If X is a random varibale with probability distribution $P(X=k)=\frac{(k+1)C}{2}, K=0,1,2,....$ then find C.

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