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## MATHS

# BOOKS - VGS PUBLICATION-BRILLIANT 

## MODEL PAPER 12

## Section A

1. Find the complex conjugate of $(3+4 i)(2-3 i)$

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2. If $z_{1}=-1$, and $z_{2}=-i$, then find $\operatorname{Arg}\left(z_{1} z_{2}\right)$

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3. Find the values of the following :

$$
\left(\frac{\sqrt{3}}{2}+\frac{i}{2}\right)^{5}-\left(\frac{\sqrt{3}}{2}-\frac{i}{2}\right)^{5}
$$

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4. If $\alpha, \beta$ are the roots of the equation $a x^{2}+b x+c=0$, find the values of the following expressions in terms of $a, b, c$.
$\frac{1}{\alpha}+\frac{1}{\beta}$

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

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

## PERMUTATION

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7. If $10 .{ }^{n} C_{2}=3 .{ }^{n+1} C_{3}$ find n .

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8. Find the set of values of $x$ for which the binomial expansion $(3-4 x)^{3 / 4}$ is valid.
9. Find the mean deviation from the mean of the data 6,7,10,4,12,13,12,16.

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10. The probability that a person chosen at random is left handed (in hand writing) is 0.1 what is the probability that in a group of ten people there is one and only one who is left handed.

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1. Show that the points in the Argand plane represented by the complex numbers
$-2+7 i,-\frac{3}{2}+\frac{1}{2}+i 4-3 i \frac{7}{2}(1+i)$ are the vertices of a rhombus.

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2. Prove that $\frac{1}{3 x+1}+\frac{1}{x+1}-\frac{1}{(3 x+1)(x+1)}$ does not lie between 1 and 4 , if x is real.

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3. If the letters of the word EAMCET are permuted in all possible ways and if the words thus formed are arranged in the dictionary order, find the rank of the word EAMCET.
4. Simplify ${ }^{34} C_{5}+\sum_{r=0}^{4}{ }^{(38-r)} C_{4}$.

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5. Resolve the $\frac{2 x^{2}+3 x+4}{(x-1)\left(x^{2}+2\right)}$ into partial fractions.

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6. If two numbers are selected randomly from 20 consecutive natural numbers, find the probability that the sum of the two numbers is (i) an even number (ii) an odd number.
7. If $A, B$ are independent events with $P(A)=0.2, P(B)=0.5$ Find $P\left(\frac{A}{B}\right)$

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2. If $A, B$ are independent events with $P(A)=0.2, P(B)=0.5$ Find $P\left(\frac{B}{A}\right)$

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3. If $A, B$ are independent events with $P(A)=0.2, P(B)=0.5$ Find $P(A \cap B)$
4. If $A, B$ are independent events with $P(A)=0.2, P(B)=0.5$ Find $P(A \cup B)$

## (D) Watch Video Solution

5. If $\cos \alpha+\cos \beta+\cos \gamma=0 \sin \alpha+\sin \beta+\sin \gamma$, Prove that
$\cos ^{2} \alpha+\cos ^{2} \beta+\cos ^{2} \gamma=\frac{3}{2}=\sin ^{2} \alpha+\sin ^{2} \beta+\sin ^{2} \gamma$.

## (D) Watch Video Solution

6. Solve $x^{4}+x^{3}-16 x^{2}-4 x+48=0$ given that the product of two of the roots is 6 .
7. If the coefficients of $r^{\text {th }},(r+1)^{\text {th }}$ and $(r+2)^{\text {nd }}$ terms in the expansion of $(1+x)^{n}$ are in A.P. then show that $n^{2}-(4 r+1) n+4 r^{2}-2=0$.

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8. If $x=\frac{5}{(2!) \cdot 3}+\frac{5.7}{(3!) \cdot 3^{2}}+\frac{5.7 .9}{(4!) \cdot 3^{3}}+\ldots$.
then find the value of $x^{2}+4 x$.

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

| Marks obtained | $0-10$ | $10-20$ | $20-30$ | $30-40$ | $40-50$ |
| :---: | :---: | :---: | :---: | :---: | :--- |
| No. of students | 5 | 8 | 15 | 16 | .6 |

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10. State and prove addition theorem on probability.

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11. The range of a random variable $X$ is $\{0,1,2\}$. Given that $P(X=0)=3 c^{3}, P(X=1)=4 c-10 c^{2}, P(X=2)=5 c-1$. find the value of $c$

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12. The range of a random variable $X$ is $\{0,1,2\}$. Given that $P(X=0)=3 c^{3}, P(X=1)=4 c-10 c^{2}, P(X=2)=5 c-1$. find the value of $c$

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13. The range of a random variable $X$ is $\{0,1,2\}$. Given that $P(X=0)=3 c^{3}, P(X=1)=4 c-10 c^{2}, P(X=2)=5 c-1$
i) Find the value of $c$
ii) $P(X<1), P(1<X \leq 2)$ and $P(0<X \leq 3)$

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14. The range of a random variable $X$ is $\{0,1,2\}$. Given that

$$
P(X=0)=3 c^{3}, P(X=1)=4 c-10 c^{2}, P(X=2)=5 c-1
$$

where c is constant.
Find (i) the value of c (ii) $P(X<1)$
(iii) $P(1<X \leq 2)$ (iv) $P(0<X \leq 3)$

