# Model Paper <br> MATHEMATICS (New) 

Inter Part-I
(Fresh/Reappear)
Note: Time allowed for Section - B and Section - C is 2 Hours and 40 minutes.

## Section - B

Marks: 50
Q-II Answer any TEN parts. Each part carries FIVE marks.

1. If $Z_{1}=2 a-3 b i, Z_{2}=-a+2$ bi then verify $\overline{Z_{1}} Z_{2}=\bar{Z}_{1} \bar{Z}_{2}$
2. If $A$ is a square matrix of order 3 , then show that $A+A^{t}$ is symmetric.
3. Show that $2 i-5 j-3 k$ is perpendicular to both $2 i-j+3 K$ and $i-2 j+4 k$
4. Insert three arithmetic means between $\frac{1}{2}$ and 9 .
5. Sum 1.4.7 + 4.7.10+7.10.13+ $\qquad$ To n terms.
6. How many diagonals can be drawn in a plane figure of 11 sides?
7. Find the coefficient of $x^{9}$ in the expansion of $\left(x^{2}+\frac{4 b}{x}\right)^{15}$
8. Find the domain and range of $\frac{2 x+5}{x-3}$
9. Find the maximum and minimum values of the function $f(x, y)=7 x+21 y$ subject to the constraints $2 x+y \geq 2, \quad 2 x+3 y \leq 6, \quad x+2 y \leq 8, \quad x \geq 0, y \geq 0$
10. Prove that $\operatorname{Tan}(\alpha+\beta) \operatorname{Tan}(\alpha-\beta)=\frac{\operatorname{Tan}^{2} \alpha-\operatorname{Tan}^{2} \beta}{1-\operatorname{Tan}^{2} \alpha \operatorname{Tan}^{2} \beta}$
11. Two cars leave a station at the same time. One runs $30^{\circ}$ east of north at $250 \mathrm{~km} / \mathrm{h}$, the other $45^{\circ}$ east of south at $300 \mathrm{~km} / \mathrm{h}$. How far apart are they at the end of 2 hours.
12. Draw the graph of $y=\operatorname{Cos} 2 x \quad 0 \leq x \leq 2 \pi$
13. Show that $\operatorname{Tan}\left(\operatorname{Sin}^{-1} x\right)=\frac{x}{\sqrt{1-x^{2}}}$

> Section - C

Marks: 30

## Note : Attempt any THREE questions. Each question carries equal marks.

Q-III (a) Use Crammer's rule to solve the system of equation $2 x-y+3 z=10, \quad 2 x+y-2 z=-4, \quad 3 x+y+z=7$
(b) Find the value of $t$ so that the vectors $\mathrm{ti}+\mathrm{j}+\mathrm{k}, \mathrm{i}+\mathrm{tj}+\mathrm{k}, \mathrm{i}+\mathrm{j}+\mathrm{tk}$ are coplanar.

Q-IV (a) If $\mathrm{a}_{10}=\mathrm{x}, \mathrm{a}_{13}=\mathrm{y}, \mathrm{a}_{16}=\mathrm{z}$ show that $\mathrm{xz}=\mathrm{y}^{2}$
(b) Given $P(A)=0.5$ and $P(B)=0.10$. Find $P(A \cup B)$ if $A$ and $B$ are mutually exclusive.

Q-V (a) Prove that $\operatorname{Sin} 3 \theta+\operatorname{Sin} \theta+2 \operatorname{Sin} 2 \theta=4 \operatorname{Sin} 2 \theta \operatorname{Cos}^{2} \frac{\theta}{2}$
(b) Find the area of the inscribed circle of the triangle whose sides measures 11,12 and 13 unit.

Q-VI (a) Solve the equation $2 \operatorname{Sin}^{2} x-3 \operatorname{Sin} x+1=0$
(b) The angle of elevation of a building is $46^{\circ}$ from $A$ and $63^{\circ}$ from $B$. If $A B$ is 25 m then find the height of the building.

