Model Paper
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 $Z_1 = 2a - 3bi$, $Z_2 = -a + 2bi$ then verify $\overline{Z_1 Z_2} = \overline{Z}_1 \overline{Z}_2$
2. If A is a square matrix of order 3, then show that $A + A^t$ is symmetric.
3. Show that $2i - 5j - 3k$ is perpendicular to both $2i - j + 3K$ and $i - 2j + 4k$
4. Insert three arithmetic means between $\frac{1}{2}$ and 9.
5. Sum $1.4.7 + 4.7.10 + 7.10.13 + \ldots\ldots$ 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 $\left(x^2 + \frac{4b}{x}\right)^{15}$
8. Find the domain and range of $\frac{2x+5}{x-3}$
9. Find the maximum and minimum values of the function $f(x,y) = 7x + 21y$ subject to the constraints $2x + y \geq 2$, $2x + 3y \leq 6$, $x + 2y \leq 8$, $x \geq 0, y \geq 0$
10. Prove that $\text{Tan}(\alpha+\beta)\,\text{Tan}(\alpha-\beta) = \frac{\text{Tan}^2\alpha - \text{Tan}^2\beta}{1 - \text{Tan}^2\alpha\,\text{Tan}^2\beta}$
11. Two cars leave a station at the same time. One runs 30° east of north at 250 km/h, the other 45° east of south at 300 km/h. How far apart are they at the end of 2 hours.
12. Draw the graph of $y = \text{Cos } 2x \quad 0 \leq x \leq 2\pi$
13. Show that $\text{Tan}\left(\text{Sin}^{-1} x\right) = \frac{x}{\sqrt{1-x^2}}$

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
$2x - y + 3z = 10$, $2x + y - 2z = -4$, $3x + y + z = 7$

(b) Find the value of t so that the vectors
$ti + j + k$, $i + tj + k$, $i + j + tk$ are coplanar.

Q-IV **(a)** If $a_{10} = x$, $a_{13} = y$, $a_{16} = z$ show that $xz = y^2$

(b) Given P(A) = 0.5 and P(B) = 0.10. Find P (A U B) if A and B are mutually exclusive.

Q-V **(a)** Prove that $\text{Sin } 3\theta + \text{Sin } \theta + 2 \text{ Sin } 2\theta = 4 \text{ Sin } 2\theta \text{ Cos}^2 \frac{\theta}{2}$

(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 $2 \text{ Sin}^2 x - 3 \text{ Sin } x + 1 = 0$

(b) The angle of elevation of a building is 46° from A and 63° from B. If AB is 25 m then find the height of the building.