Term End External Examination 1st Semester (Session-Feb 2025)
Subject: Multidisciplinary Course
Course No and Title: MTM022I/ Basic Course in Mathematics
Time: 1.15 hours Max Marks:50 Min. Marks:20

Section A: Objective Type Questions

Q1. Choose the appropriate Answer: (4x1.5=06)

i. **Determinant of the matrix** $A = \begin{bmatrix} 0 & 1 & 1 \\ 5 & 0 & 1 \\ 4 & 3 & 0 \end{bmatrix}$ **is**

A 1 **B** 0

C 2 **D** None of the Above

ii. The modulus and amplitude of the complex number z = 1 + i is given by

A $-1, \pi/4$ **B** $1, \pi/4$

C $-1, -\pi/4$ **D** None of the above

iii. **All real numbers are complex.**

A Not necessarily **B** Cannot say
C true **D** false

iv. **√9 is an irrational number.**

A true **B** false
C cannot say **D** none of the above

Section-B: Descriptive Type Questions (Short Type)

Q2: Answer all the Questions (4 x 4 =16)

i. Define a straight line and write down the equations of a straight line with slope m.

ii. Simplify (3 + 4i) + (2 – 3i) and (4 + 3i) - (1 – 2i)

iii. Define real and imaginary parts of the complex number (2 + 5i)(3 – 2i).

iv. Find AB, where A= $\begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$ and B= $\begin{bmatrix} 2 & 3 \\ -4 & -1 \end{bmatrix}$.

Section – C: Descriptive Type Questions (Medium Type)

Answer all the questions: (2 x 7=14)

Q3. Find the conjugate of the complex numbers $z = (1 + i) - (1 - i)$ and express it in the Polar form.

OR

Find A^{-1} and B^{-1} , where A= $\begin{bmatrix} 2 & 3 \\ 1 & 1 \end{bmatrix}$ and B= $\begin{bmatrix} 3 & 5 \\ 2 & 1 \end{bmatrix}$.

Q4. Find the sum, difference and product of the two matrices

A= $\begin{bmatrix} 1 & -1 & 2 \\ -1 & 0 & 3 \\ 1 & -2 & 1 \end{bmatrix}$ and B= $\begin{bmatrix} 2 & -2 & 1 \\ 0 & -1 & 3 \\ 1 & -1 & 1 \end{bmatrix}$

OR

Find the equation of two straight lines with slope b1 and b2 respectively and write down the formula for angle α between the two lines.

Section – D: Descriptive Type Questions (Long Type)

Answer any one of the following: (1 x 14=15)

Q5. Is √5 an irrational number? Justify your answer

Q6. Express the following complex numbers in the Polar form:

$z = (1 + i)\overline{(1 - i)}$ ii) $z = (1 - i)^2$