

KATHMANDU UNIVERSITY

Dulikhel, Kavre

Internal Examination II -2025

Subject: MCSC- 201

Group : CM

Time : 60 min

F.M. : 20

Attempt all questions.

1. Let R be an equivalent relation on a set A then for each $a, b \in A$, prove that $a R b$ if and only if $R(a) = R(b)$. Find M_{R^2} , if R be the

relation on set A whose matrix is $M_R = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$. [2 + 2]

2. Define the permutation function. Let $A = \{a, b, c, d, e, f\}$. Compute $(a, c, e) \circ (b, f, c)$ and check the resultant permutation is even or odd. [1 + 2 + 1]

3. If (A, \leq) and (B, \leq) are two poset. Then show that $(A \times B, \leq)$ is poset with partial order \leq define by $(a, b) \leq (a', b')$ if $a \leq a'$ in A and $b \leq b'$ in B . [4]

4. Define isomorphism function on semi-group. Let T be the set of all even integers, show that the semi-group $(Z, +)$ and $(T, +)$ are isomorphic. [1 + 3]

5. Define Euler path. G is the set of all non-zero real numbers and $a * b = \frac{ab}{2}$ for all a, b in G . Prove that $(G, *)$ is a group.

[1 + 3]

The End