

**Raghunathpur College**  
**Internal Examination-2020**  
**Mode of Examination: Assignment writing**  
**Subject: Mathematics**  
**Paper: BMTMSERT304 (Logic and Sets)**  
**Full Marks: 10**

**Answer any five questions:  $2 \times 5 = 10$**

1. Let  $A = \{2, 3, 5, 6\}$ ,  $B = \{8, 10, 13, 20\}$ ,  $C = \{a, b, c, d\}$  and  $\rho$  is a relation between  $A$  and  $B$  defined by  $\rho = \{(2, 8), (2, 20), (3, 10), (5, 10), (6, 20)\}$  and  $\sigma$  is a relation between  $B$  and  $C$  defined by  $\sigma = \{(8, b), (8, c), (10, a), (13, d), (20, c)\}$ , then find  $\sigma \circ \rho$  and  $\rho^{-1}$ .
2. Define equivalence relation on a set.
3. If a set  $S$  contain 7 elements, then
  - (i) How many relation can be defined on  $S$ .
  - (ii) How many relation are reflexive and how many relations are symmetric.
4. Define Poset (Partially ordered set) with example.
5. If  $A \cup B = B$  holds for all subsets  $B$ , then prove that  $A = \phi$ .
6. What do you mean by "conjunction".
7. Construct the truth table for the proposition  $\sim p \vee q$ .
8. Construct the truth table for the proposition  $(p \vee q) \wedge (q \wedge r)$ .