Department of Mathematics
National Institute of Technology, Srinagar

Session :Autumn-2018
Examination: Mid-Term — Max. Marks: 30
Subject: Discrete Mathematics — Time: 1.5 Hours
Course Code:MTH-301 — Date: 29/09 /2018
Semester: B. Tech 3rd(C.S.E. & I.T.)

Note: Attempt all questions. All notations and symbols have their usual meanings.

1. Consider the set A having 4 elements
   (a) Find total number of equivalence relations on A (2)
   (b) Find total number of symmetric relations on A (2)
   (c) Find total number of anti-symmetric relations on A (2)
   (d) Find total number of different symmetric relations on A having 4 elements (2)
   (e) Find total number of different Anti-symmetric relations on A having 4 elements. (2)

2. (a) Construct the truth table for (i) $p \vee \sim q \rightarrow p$ (ii) $(\sim (p \wedge q) \vee r) \rightarrow \sim p$ (5)
   (b) Define partial ordered relation. Consider a set $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$. Let x$R$y whenever y is divisible by x. Is relation Equivalence relation or partial ordered relation or both. (5)

3. (a) Draw the Hasse diagram of D_{30}. Find the sublattices of D_{30} (5)
   (b) Consider the divides relation on the set $S = \{2, 3, 5, 30, 60, 120, 180, 360\}$
   (i) Find all minimal and maximal elements (ii) Find greatest and least element (iii) find the two chains of length 4 (iv) is S a Lattice. (5)

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