Code No: 133BC **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2022
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Is (p → q) → ((p → q) → q) a tautology?
b) Verify whether the following statement is tautology or not. [8+7]
{[p → (q ∨ r)] ∧ (~q)} → (p → r)

2.a) Show that $(P \vee Q) \wedge (\neg p \wedge (\neg p \wedge Q)) \Leftrightarrow (\neg p \wedge Q)$
b) Obtain the principal conjunctive normal form of the following formula.
$(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$ [7+8]

3.a) Find the number of committees of 5 that can be selected from 7 men and 5 women if the committee is to consist of atleast 1 man and atleast 1 woman.
b) State pigeon hole principle with example. [8+7]

4.a) Explain reflexive, symmetric, transitive, equivalence and partial ordering relations with example.
b) Let A={1, 2, 3, 4, 6}, and let R be the relation on A defined by "x divides y", written x|y. (Note: x|y iff there exists an integer z such that xz = y)
i) Write R as a set of ordered pairs.
ii) Draw the digraph of R.
iii) Draw the Hasse diagram of the relation. [7+8]

5. A survey of 500 television viewers of a sports channel produced the following information 285 watch cricket, 195 watch hockey, 115 watch football, 45 watch cricket and football, 70 watch cricket and hockey, 50 watch hockey and football and 50 do not watch any of the three kinds of games.
a) How many viewers in the survey watch all three kinds of games?
b) How many viewers watch only cricket? [8+7]

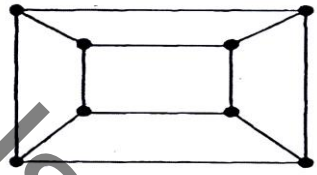
6.a) A certain question paper contains two parts A and B each containing five questions. How many different ways a student can answer six questions by selecting atleast two questions from each part?
b) How many three-digit numbers are there which are even and have no repeateddigits? [8+7]

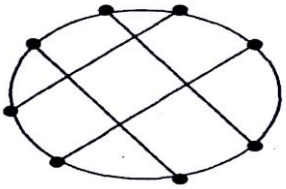
7.a) Solve the Fibonacci recurrence relation $F_n = F_{n-1} + F_{n-2}$,with $F_0 = 0$ and $F_1 = 1$.

b) Solve the recurrence relation $a_n = 7a_{n-1} - 10a_{n-2}$ with $a_0 = 2$ and $a_1 = 3$. [8+7]

8.a) Differentiate DFS and BFS.

b) Show whether the two graphs below are isomorphic or not. [7+8]





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