Code No: 153CF **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, March - 2022
DISCRETE MATHEMATICS
(Common to CSE(AIML), CSE(DS), CSE(IOT))

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

Answer any five questions
All questions carry equal marks
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1. Obtain the PDNF and PCNF of the following statement formula: $(\neg P \vee \neg Q) \rightarrow (P \leftrightarrow Q)$. [15]

2.a) Show that $(\exists x)(p(x) \wedge (Q(x) \Rightarrow (\exists x)(p(x) \wedge \exists (x) Q(x)$.
b) Symbolize the following argument and check for its validity:
All men are giants.
Not all birds can fly.
Some babies are illogical.
There is a student who likes maths, but not history. [7+8]

3.a) Use a Venn diagram to illustrate the relationships $A \subset B$ and $A \subset C$.
b) Prove that the relation "congruence modulom" given by
R={<x,y> / x-y is divisible by m} over
the set of positive integers is an equivalence relation. [6+9]

4.a) Give the definition and examples of reflexive symmetric, anti symmetric and transitive relations.
b) What is meant by Poset? Draw the Hasse diagram for the Poset.
<{2,4,5,10,12,20,25}/> and compute LUB and GLB. [7+8]

5.a) Conjecture a formula for the sum of the first *n* positive odd integers. Then prove your Conjecture using mathematical induction.
b) Express the linear search algorithm as a recursive procedure and explain. [8+7]

6.a) Prove that *2* divides n^2+n whenever *n* is a positive integer, using mathematical induction.
b) Give a recursive algorithm to compute the factorial of a number and explain. [8+7]

7. Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ where $a_0=10$ and $a_1= 41$. [15]

8.a) Find the degree sequence of k_4 graph.
b) What are the various ways of representing graphs? Explain them briefly with relevant examples. [6+9]

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