(Please write your Enrollment Number) **Enrollment No._____**

Minor/Mid-Term Examination- ONLINE MODE
(Non-CBCS/CBCS)
B.Tech CSE/IT 3rd SEM
(October, 2020)

Subject Code: BCS-203	**Subject: Discrete Structures**
Time: 1 Hour	**Maximum Marks:** 30
Note: Q. 1 is compulsory. Attempt any one question from the rest.	

Q1 **(5*3=15)**

(1) Give the symbolic form of the following statements

(i) The computer game is correct if and only if, it produces the correct answer for all possible set of input data.

(ii)Payment will be made on eleventh unless a new request is granted.

(2) Translate each of these statements into logical expressions using predicates, quantifiers and logical connectives

(i) No one is perfect
(ii) All your friends are perfect
(iii) Atleast one of your friend is perfect

3) Negate each quantified proposition

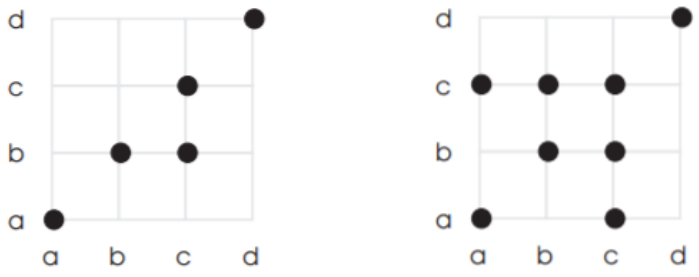
(i) $\forall x \ (x^2 = x)$
(ii) $\exists (x) (x^3+2x^2=x+2)$
(iii) $\forall x \{\sim(x^5=4x)\}$

4) Show that the hypotheses "I left my notes in the library or I finished the rough draft of the paper" and "I did not leave my notes in the library or I revised the bibliography" imply that "I finished the rough draft of the paper or I revised the bibliography

5) Show that if n is an integer and $n^3 + 5$ is odd, then n is even using contraposition

Q2 **(5x3= 15)**

(a) For the given graphs check whether the relations are equivalence relation or not



(b) Using Venn diagram prove that

1) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
2) $(A \cap B)^c = A^c \cup B^c$

(C) Check whether elements of the power set of A = {1,2,3} under relation subset is a Partially Ordered Set or Totally Ordered Set. Draw the Hasse diagram of the above set

Q3 **(5x3= 15)**

(a) Using mathematical Induction Show that

$1^2 + 2\,X\,2^2 + 3^2 + 2\,X\,4^2 + 5^2 + 2\,X\,6^2 \ldots\ldots\ldots = \frac{n\,(n+1)^2}{2}$ if n is even and

$= \frac{n^2(n+1)}{2}$ if n is odd.

	(b) Determine whether f : Z x Z ─> Z is one to one if (i) $f(n) = n^2 + 1$ (ii) f(n) = ⌐(n/2)¬ (ceil (n/2))
	(C) Show that if there are 30 students in a class, then at least two have last names that begin with the same letter

Declaration of the Paper Setter

I have followed these instructions during paper setting with best of my knowledge

a. No direct questions such as definitions, comparisons, diagrams etc has been given where the student can use the book/ online resources directly to answer the question and

b. Ensured that each and every question is verified through google and the same is not directly available and

c. Ensured that the paper covers entire syllabus, all the questions are un- ambiguous, as per the format and followed university norms for setting up the question paper.

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Declaration of the departmental Moderation Committee	
	The above paper is moderated and followed above guidelines Name of the HoD: Name of the Faculty1: DR A K Mohapatra Name of the Faculty2: Mr Vikash