Sri
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DEPARTMENT OF SCIENCE & HUMANITIES
CONTINUOUS ASSESSMENT TEST - I

Year / Sem: II / III — Date: 17.08.20
Branch: CSE — Time: 1.30 hrs.
Subject code/Subject Name: MA8351 / Discrete Mathematics — Total marks: 50

Part A (5 x 2 = 10)

1. Verify $(q \wedge r) \rightarrow q$ is a tautology. (E) (CO1)
2. Write down the contrapositive, converse, and inverse of the implication "If it is raining then I get wet." (A) (CO1)
3. Obtain PDNF of $\neg p \vee q$ (C) (CO1)
4. Symbolize the expression "For any x and any y, if x is taller than y, then y is not taller than x". (U) (CO1)
5. Prove that if n is an integer and n^2 is an odd integer, then n is an odd integer by indirect method. (C) (CO1)

Part – B (2 x 13 = 26)

6. a) Prove that $\forall x\,(P(x) \rightarrow Q(x))$; $\forall x\,(R(x) \rightarrow \neg Q(x)) \Rightarrow (\forall x)(R(x) \rightarrow \neg P(x))$. (C) (CO1)

   b) Prove that t is a valid conclusion from the premises $p \rightarrow q$, $q \rightarrow r$, $r \rightarrow s$, $\neg s$ and $p \vee t$. (C) (CO1)

(OR)

6. c) Show that the premises $p \rightarrow q$, $p \rightarrow r$, $q \rightarrow \neg r$, p are inconsistent. (U) (CO1)

   d) Prove that $\exists x\,(P(x) \wedge S(x))$, $\forall x\,(P(x) \rightarrow R(x)) \Rightarrow \exists x\,(R(x) \wedge S(x))$. (C) (CO1)

7. a) Without using truth table find the **PCNF** and **PDNF** of $P \vee (\neg P \rightarrow (Q \vee (\neg Q \rightarrow R)))$ (R) (CO1)

   b) Using the law of logic prove that $(\neg p \vee q) \wedge (p \wedge (p \wedge q)) \equiv p \wedge q$. (C) (CO1)

(OR)

thout using truth table find the PCNF and PDNF of $(\neg P \rightarrow R) \wedge (Q \Leftrightarrow P)$. 1)

d) Using the law of logic prove that $\neg(p \wedge q) \rightarrow (\neg p \vee (\neg p \vee q)) \Leftrightarrow \neg p \vee q$. (C) (CO1)

Part – C (1 x 14 = 14)

8. a) Show that the hypothesis, "It is not sunny this afternoon and it is colder than yesterday", we will go swimming only if it is sunny", "If we do not go swimming, then we will take a canoe trip" and "if we take a canoe trip, then we will be home by sunset" lead to the conclusion "We will be home by sunset." (U) (CO1)

b) Prove that $\sqrt{2}$ is irrational, using suitable proof method. (C) (CO1)

ALL THE BEST

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R2017	MA8351	DISCRETE MATHEMATICS

C01	Apply the knowledge of the concepts needed to test the logic of a program.
C02	Introduce the core ideas of combinatorial mathematics and apply these ideas to practical problems.
C03	Explain basic concepts in Graph theory and Define how graphs serve as models for many standard problems
C04	Create an awareness of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science and Analyze the concepts and properties of algebraic structures such as groups, rings and fields.
C05	Define the basic ideas of posets and develop the concepts of lattices which has application in finite state machines.

C06	Introduce the concepts of discrete objects and relationships [illegible]hem and create an ability to deal with abstraction, combinatorics, algorithms and graphs.