BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering

B. Tech. Sem - III :SUMMER : 2023

SUBJECT : DISCRETE MATHEMATICAL STRUCTURES

Day : Thursday | Time : 02:30 PM-05:30 PM

Date : 11-05-2023 | S-25311-2023 | Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data if necessary.
5) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Find the principle disjunctive normal form (PDNF) of $(P \wedge Q) \vee (\neg P \wedge R) \vee (Q \wedge R)$ without using truth table. Also find its principle conjunctive normal form (PCNF). **(10)**

OR

Q.1 Show if $(P \vee Q) \wedge \neg (\neg P \wedge (\neg Q \vee \neg R)) \vee (\neg P \wedge \neg Q) \vee (\neg P \wedge \neg R)$ is a tautology without using truth table. **(10)**

Q.2 Among 50 patients admitted to a hospital, 25 are diagnosed with pneumonia, 30 with bronchitis and 10 with both pneumonia and bronchitis. Determine: **(10)**

i) The number of patients diagnosed with pneumonia or bronchitis (or both).

ii) The number of patients not diagnosed with pneumonia or bronchitis.

OR

Q.2 A new employee checks the hats of 10 people at restaurant, forgetting to put claim check numbers on the hats. When customers return for their hats, the checker gives them back hats chosen at random from the remaining hats. What is the probability that no one receives the correct hat? **(10)**

Q.3 Define relation and explain different types of relations with example. **(10)**

OR

Q.3 How many onto functions are there from a set with 6 elements to set with 3 elements. **(10)**

Q.4 Explain with definitions and examples what is Subgroup, Monoid, Group and Abelian group. **(10)**

OR

Q.4 Prove that every subgroup of a cyclic group is cyclic. **(10)**

Q.5 How many positive integers not exceeding 1000 are divisible by none of 3, 7, and 11? **(10)**

OR

Q.5 Using mathematical induction, prove that every integer $n \geq 2$ is either a prime number or product of prime numbers. **(10)**

Q.6 Consider the set $D_{50} = \{1,2,5,10,25,50\}$ the relation divides (/) be a partial ordering relation on D_{50} **(10)**

i) Draw Hasse diagram of D_{50}.

ii) Determine all upper bounds and lower bounds of 5 and 10.

OR

Q.6 Show that complete bipartite graph $K_{m,n}$ with m, $n \geq 2$ is Hamiltonian if and only if $m = n$. **(10)**

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BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering

B. Tech. Sem - III :SUMMER : 2023

SUBJECT : MACHINE ORGANIZATION & MICROPROCESSOR

Day : Friday | Time : 02:30 PM-05:30 PM

Date : 12-05-2023 | S-25312-2023 | Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data, if necessary.

Q.1 Describe general purpose and special purpose register of 8086 with suitable diagram. **(10)**

OR

Q.1 Describe classification of instruction set of 8086. Explain Arithmetic instruction with suitable example. **(10)**

Q.2 Draw the structure of fixed-point representation of number. Also represent following unsigned binary number using 4 integer bits and 3 fractional bits of fixed-point representation **(10)**
Number = 0110011

OR

Q.2 Represent $(1259.125)_{10}$ in single and double precision format. **(10)**

Q.3 Draw and explain concept of hardwired implementation and microprogrammed implementation of a Control Unit. **(10)**

OR

Q.3 Write and explain the control sequence for execution of instruction Add (R3), R1. **(10)**

Q.4 Define cache memory and Analyze the three-mapping function of cache memory. **(10)**

OR

Q.4 Draw and explain Associate cache organization. **(10)**

Q.5 Define DMA Bus Abbreviation. Also briefly explain different bus abbreviation techniques. **(10)**

OR

Q.5 List three board classification of external or internal or peripheral devices. **(10)**

Q.6 Define clustering also explain cluster configuration method and its limitation. **(10)**

OR

Q.6 List different pipeline hazards? Explain each pipeline hazard in detail. **(10)**

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