II B. Tech I Semester Supplementary Examinations, July - 2023
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Com to CSE, CST, CSE(AIML), CSE(AI), CSE(DS), CSE(AIDS), CSE(CS), CSE(IOT&CSIBCT),
CSBS, CSE(IOT), AI&DS, AI&ML, CS, CSD)

Time: 3 hours   Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
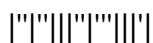~~~~~~~~~~~~~~~~~~~~~~~~~

UNIT-I

1 a) Obtain POS of the following formulas   [7M]
(i)$(P \wedge Q \wedge R) \vee (\sim P \wedge R \wedge Q) \vee (\sim P \wedge \sim Q \wedge \sim R)$

   b) Express the following statements using quantifiers. Then construct the negation   [7M]
of the statement i) Every bird can fly ii) Some birds can talk

Or

2 a) Define well formed formula? Write in brief about well defined formulas.   [7M]

   b) Obtain POS of the following formulas: [7M]
(i)$(P \wedge Q \wedge R) \vee (\sim P \wedge R \wedge Q) \vee (\sim P \wedge \sim Q \wedge \sim R)$ (ii) $PV(\sim P \rightarrow (QV(\sim Q \rightarrow R)))$

UNIT-II

3 a) For any two sets A and B Prove the following Identity $A-(A \cap B) = A-B$ [7M]

   b) Let A=(6,12,18,24,36,72), $a \leq b$ if and only if a divides b. Draw Hasse diagram   [7M]
for it and prove that it is a lattice, but not a distributive lattice.

Or

4 a) If A={1,2,3,4} and P={{1,2},{3},{4}} is a partition of A. Find the equivalence   [7M]
relation determined by P.

   b) Draw the Hasse diagram for X={2,3,6,24,36,48} and relation ≤ be such that x≤y,   [7M]
if x divides y

UNIT-III

5 a) A group of 8 scientists is composed of 5-psychologists and 3-sociologists, in   [7M]
how many ways can a committee of 5 be formed that has 3- psychologists and 2-
sociologists.

   b) How many ways can we distribute 14 indistinguishable balls in 4 numbered   [7M]
boxes so that each box is non empty?

Or

6 a) Find the number of arrangements of the letters of MISSISSIPPI .   [7M]

   b) Out of 12 employees a group of four trainees is to be sent for software testing   [7M]
and QA training of one month. (i) In how many ways a group of the four
employees be selected? (ii) what if there are two employees who refuse to go
together for training

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UNIT-IV

7 a) Solve the recurrence relation an-7an-1+12an-2 =0 for n≥2 where a0=1, a1=2.　　[7M]

   b) Solve the recurrence relation using generating function an-6an-1=0 for n≥1　　[7M]
       wherea0=1.

<center>Or</center>

8 a) Find the general expression for a solution to the recurrence relation　　　　[7M]
       an-5an-1+6an-2 =n(n-1) for   n≥2

   b) What is an nth order linear homogenous recurrence relation with constant　　[7M]
       coefficients? Give examples.

UNIT-V

9 a) Draw binary search tree for the list : 2,1,5,6,8,9,7,3,4.　　　　　　　　[7M]

   b) Find the chromatic number of the following i) Cn   ii) Kn   iii) Km,n　　[7M]

<center>Or</center>

10 a) Discuss in brief about BFS and DFS of a graph.　　　　　　　　　　　[7M]

    b) State and prove Euler's formula for a plane connected graph.　　　　　[7M]

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