**R16**

Reg. No:

## SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
### (AUTONOMOUS)
### B.Tech II Year I Semester Supplementary Examinations Feb-2021
### MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE & CSIT)

Time: 3 hours                                                                 Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

### UNIT-I

1   a   Explain Conjunction and Disjunction with suitable examples.                    6M
    b   Define tautology and contradiction with examples.                              6M

**OR**

2   a   What is principle disjunctive normal form? Obtain the PDNF of                  6M
        $P \to ((P \to Q) \wedge \neg(\neg Q \vee \neg P))$
    b   What is principle conjunctive normal form? Obtain the PCNF of                  6M
        $(\neg P \to R) \wedge (Q \leftrightarrow P)$

### UNIT-II

3   a   Define Bijective function. Give  two  examples .                              6M
    b   Define primitive recursive function? Show that the function $f( x, y ) = x + y$ is   6M
        primitive recursive.

**OR**

4   a   Prove that the set $Z$ of all integers with the binary operation *, defined as   6M

        $a * b = a + b + 1, \forall a, b \in Z$ is an abelian group.
    b   Show that the set=$\{1,2,3,4,5\}$ is not a group under addition & multiplication   6M
        modulo 6.

### UNIT-III

5   a   Define product rule? State Binomial theorem? Define permutation?              6M
    b   Find the coefficient of (i) $x^3 y^2 z^2$ in $(2x - y+z)^9$ . (ii) $x^6 y^3$ in $(x - 3y)^9$.   6M

**OR**

6   a   Find the number of arrangements of the letters in the word ACCOUNTANT.        4M
    b   How many permutations can be formed out of the letters of word " SUNDAY" ?    8M
        How many of these (i) Begin with S? (ii) end with Y? (iii) begin with S & end with
        Y ? (iv) S &Y always together ?

### UNIT-IV

7   a   Solve    $a_n = a_{n-1} + 2a_{n-2}$ ,$n > 2$ with condition the initial  $a_0 = 0$ , $a_1 = 1$.   6M
    b   Solve    $a_{n+2} - 5 a_{n+1} + 6 a_n = 2$ , with condition the initial $a_0 = 1$ , $a_1 = - 1$.   6M

**.OR**

8   a   Determine the sequence generated by (i) $f(x) = 2e^x + 3x^2$ (ii) $7 e^{8x} - 4 e^{3x}$.   6M
    b   Find the sequence generated by the following generating functions                6M
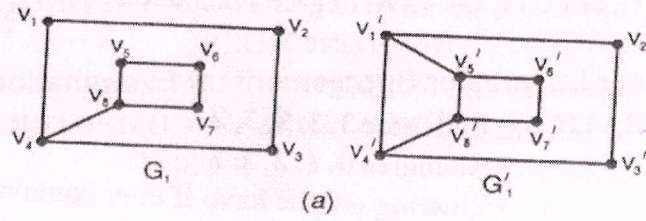        (i) $(2x - 3)^3$

        (ii) $\dfrac{x^4}{1-x}$

## UNIT-V

9    **a** Show that "In any graph the number of odd degree vertices is even".     6M

      **b** Show that the two graphs shown below are isomorphic.             6M



(a)

## OR

10   **a** Show that the maximum number of edges in a simple graph with n vertices is   6M

      n ( n-1 ) / 2

      **b** Explain   graph coloring and chromatic number with suitable examples.       6M

*** END ***