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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR  
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

DISCRETE MATHEMATICS

(Common to CSE & CSIT)

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a Write the negation of the statement "Today is Friday" and express this in simple English. **2M**
- b Define homomorphism. **2M**
- c In how many ways 5 students can be selected from 12 students without student. **2M**
- d State generating function. **2M**
- e Define Spanning Tree. **2M**

**PART-B**

(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- 2 a Define Max-terms & Min-terms of P & Q & give their truth tables. **5M**
- b Obtain PCNF of  $A = (p \wedge q) \vee (\neg p \wedge q) \vee (q \wedge r)$  by constructing PDNF. **5M**

**OR**

- 3 a Obtain the principle conjunctive normal form  $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$ . **5M**
- b Define Quantifiers and types of Quantifiers with examples. **5M**

**UNIT-II**

- 4 a Prove that the set Z of all integers with the binary operation \*, defined as  $a * b = a + b + 1, \forall a, b \in Z$  is an abelian group. **5M**
- b Let  $A = \{1, 2, 3, 4\}$  and let  $R = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 3), (3, 3), (4, 4)\}$  be an equivalence relation on R ? **5M**

**OR**

- 5 a Explain the concepts of homomorphism and isomorphism of groups with examples **5M**
- b Let  $A = \{1, 2, 3, 4, 5, 6, 7\}$ . determine a relation R on A by  $aRb \Leftrightarrow 3 \text{ divides } (a - b)$ , show that R is an equivalence relation ? **5M**

**UNIT-III**

- 6 a Out of 80 students in a class, 60-play football, 53 play hockey and 35 both the games. How many students (i) do not play of these games? (ii) Play only hockey but not foot ball. **5M**
- b Out of 9 girls and 15 boys, how many different committees can be formed each consisting of 6 boys and 4 girls. **5M**

**OR**

- 7 a Show that if 8 people are in a room, at least two of them have birthdays that occur on the same day of the week. **6M**
- b How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions are allowed? **4M**

**UNIT-IV**

- 8 a Solve  $y_{n+2} - y_{n+1} - 2y_n = n^2$  **6M**  
b Solve  $an - 5a_{n-1} + 6a_{n-2} = 1$ . **4M**

**OR**

- 9 a Solve the recurrence relation  $a_r = a_{r-1} + a_{r-2}$  using generating function. **5M**  
b Solve  $a_n = a_{n-1} + 2a_{n-2}$ ,  $n > 2$  with conditions the initial  $a_0 = 0$ ,  $a_1 = 1$ . **5M**

**UNIT-V**

- 10 a Show that in any graph the number of odd degree vertices is even. **5M**  
b Explain In degree and out degree of graph. Also, explain about the adjacency matrix representation of graphs. Illustrate with an example. **5M**

**OR**

- 11 a Define isomorphism. Explain Isomorphism of graphs with a suitable example. **5M**  
b Show that the two graphs shown below are isomorphic. **5M**

**\*\*\*END\*\*\***