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(or)

9. a. Discuss about Lagrange's theorem with an example. **8M** 

b. Explain walks, path and circuits with an example graph.

\* \* \*

**VR17** 

**7M** 

Reg. No:

## VELAGAPUDI RAMAKRISHNA

## SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2019

Third Semester

### INFORMATION TECHNOLOGY

 $\frac{17IT3302\ DISCRETE\ MATHEMATICS\ FOR\ INFORMATION}{TECHNOLOGY}$ 

Time: 3hours Max. Marks: 70

Part-A is compulsory

Answer One Question from each Unit of Part-B

Answer to any single question or its part shall be written at one place only

### **PART-A**

 $10 \times 1 = 10M$ 

- 1. a. Define conditional statement.
  - b. Write about tautology.
  - c. Define onto function.
  - d. State about partial order relations.
  - e. Define sub group of a group.
  - f. What is linear recurrence relation?
  - g. Give the definition for a graph.
  - h. Define permutation group.
  - i. What is the power set of the set  $\{0, 1, 2\}$ ?
  - j. Draw a directed graph.

# 17IT3302

## PART-B

 $4 \times 15 = 60M$ 

### **UNIT-I**

- a. What are the contrapositive, the converse and the inverse of the conditional statement 7M
   'The home team wins whenever it is raining'?
  - b. Show that following argument is valid. 8M
    If today is Tuesday, I have a test in Mathematics or Economics.
    If my Economics professor is sick, I will not have a test in Economics.

Today is Tuesday and my Economics professor is sick. Therefore I have test in Mathematics.

(or)

- 3. a. Prove that the sum of two rational numbers is rational. **8M** 
  - b. How many ways are there to distribute hands of 5 cards to each of four players from the standard deck of 52 cards?
     7M

## **UNIT-II**

- 4. a. Draw the Hasse diagram representing the partial ordering {(a, b)|a divides b} on {1, 2, 3, 4, 6, 8, 12}. 8M
  - b. Find the generating functions for (1+x)<sup>-n</sup> and (1-x)<sup>-n</sup>, where n is a positive integer, using the extended Binomial theorem.

    7M

(or)

VR17 17IT3302

5. a. Let  $R = \{(1, 1), (2, 1), (3, 2), (4, 3)\}$ . Find the powers  $R^n$ , n = 2, 3, 4, ....

b. Let R be the relation on the set of real numbers such that a R b if and only if a-b is an integer. Is R an equivalence relation? Justify.

8M

#### **UNIT-III**

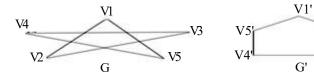
- 6. a. Find the solution to the recurrence relation  $a_n = 6a_{n-1} 11a_{n-2} + 6a_{n-3}$  with the initial conditions  $a_0 = 2$ ,  $a_1 = 5$  and  $a_2 = 15$ . 7M
  - b. Discuss about a group and its elementary properties. **8M**

(or)

- 7. a. What is group homomorphism and explain with an example? **8M** 
  - b. Use generating functions to find the number of ways to select r objects of n different kinds if we must select at least one object of each kind.
     7M

### **UNIT-IV**

- 8. a. State about normal subgroups and quotient groups. 7M
  - b. Consider the following two graphs. Are the graphs G and G' the same? Justify.8M



V2'

V3'