(or)

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

   b. Explain walks, path and circuits with an example graph. **7M**

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Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

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

Third Semester

INFORMATION TECHNOLOGY

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 x 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.

PART-B

4 x 15 = 60M

UNIT-I

2. 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 $(1+x)^{-n}$ and $(1-x)^{-n}$, where n is a positive integer, using the extended Binomial theorem. **7M**

(or)

5. a. Let R = {(1, 1), (2, 1), (3, 2), (4, 3)}. Find the powers R^n, n = 2, 3, 4, …. **7M**

   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**