VR14 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2017

Third Semester

14CS3302/14IT3302 DISCRETE MATHEMATICAL STRUCTURES

Time: 3 hours ***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 tautology and contradiction.

   b. Write about the rules : Universal specification and Existential specification.

   c. Define converse and contra positive.

   d. Define generating function.

   e. List the all permutations of A= {a, b, c}.

   f. Draw the Hasse diagram of positive divisors of 12.

   g. How to compute the transitive closure?

   h. Define lattice.

   i. What is the Hamilton path and Euler path?

   j. What is the difference between graph and tree?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q$, $Q \rightarrow R$, $P \rightarrow M$ and ~M. **7M**

   b. Show that the following premises are inconsistent **8M**

   If Jack misses many classes through illness, then he fails high school.

   If Jack fails high school, then he is uneducated.

   If Jack reads a lot of books, then he is not uneducated.

   Hence, Jack misses many classes through illness and reads a lot of books.

(or)

3. a. Write in detail about the quantifiers used in propositional logic. **7M**

   b. Obtain the PCNF of formula $(\sim P \rightarrow R) \wedge (Q \leftrightarrow P)$. **8M**

UNIT-II

4. a. A multiple choice test has 15 questions and 4 choices for each answer. How many ways can the 15 questions be answered so that i) Exactly 3 answers are correct
   ii) At least 3 answers are correct **9M**

   b. How many ways can 5 days are chosen from each of the 12 months of an ordinary year of 365 days. **6M**

(or)

5. a. Solve the recurrence relation $a_{n+2} - 5a_{n+1} + 6a_n = 2$, $n \geq 0$, $a_0 = 3$, $a_1 = 7$. **7M**

   b. Find the coefficient of x^{12} in $\frac{x^2}{(1-x)^{10}}$. **8M**

UNIT-III

6. a. Explain the properties of binary relation with examples. **7M**

   b. Prove that meet and join operations of a lattice are commutative, associative, idempotent and absorption. **8M**

(or)

7. a. Let {Z = -2, -1, 0, 1, 2, 3, ...} and relation R is defined as R = {(x, y)/x - y is divisible by 3}. Find whether the relation R on Z is equivalence or not. **7M**

   b. Explain Warshall's algorithm. Compute the transitive using Warshall's algorithm for the relation R = {(a,a), (a,b), b,c), (c,d), (c,e), (d,e)}. **8M**

UNIT-IV

8. a. State and prove Euler's formula. **9M**

   b. Prove that every simple planar graph is 5 colourable. **6M**

(or)

9. a. State and prove Grinberg's theorem. **8M**

   b. Show that the complete bipartite graph of $k_{3,3}$ is non planar. **7M**

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