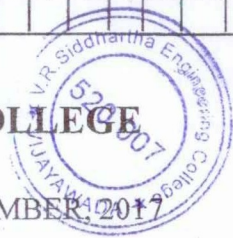


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VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(AUTONOMOUS)



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 conyerse 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 $\sim M$. **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)

VR14

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 $\{Z = -2, -1, 0, 1, 2, 3, \dots\}$ and relation R is defined as $R = \{(x, y)/x - y \text{ is divisible by } 3\}$. 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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