LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – **COMPUTER APPLICATIONS**

FIRST SEMESTER – **NOVEMBER 2018**

CA 1804 – DISCRETE STRUCTURES

Date: 25-10-2018   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART-A

Answer all Questions: -   **10 X 2 = 20**

1. What is a preposition?

2. What do you mean by a Quantifier?

3. Define the Composition of two Relations?

4. What is a Partial order relation ?

5. Define Permutation. Give an Example.

6. Define a Function.

7. What is a Digraph? Give an Example.

8. What do you mean by Shortest path?

9. Define the Cancellation property of an Algebraic System. Give an Example.

10. Define the Finite State Machines.

PART-B

5 X 8 = 40

Answer all Questions:-

11. (a) Define Converse preposition and Contrapositive preposition with an example for each.

    (OR)

    (b) Show that $\neg (p \lor q)$ and $\neg p \land \neg q$ are logically equivalent

12. (a) Explain Reflexive Relation and Symmetric Relation with an example for each.

    (OR)

    (b) Show that the relation of similarity with respect to a set of triangles is an Equivalence Relation.

13. (a) When 2 cards are taken from a pack of cards, what is the chance that one of them is a king and the other is a queen? Suppose that both cards are replaced and then 2 cards are taken. What is the chance that both of them are queens?

    (OR)

    (b) There are 6 blue balls, 5 red balls and 4 white balls in a box. When 7 balls are randomly chosen from this box, what is the chance that 2 of them are red, 2 of them are white and 3 of them are blue.

14. (a) Briefly explain pseudo graphs and weighted graphs with an example for each.

$$(OR)$$

  (b) Define the following with suitable example: (i) Rooted tree (ii) Minimum Spanning Tree.

15. (a) Explain Homomorphism property of an Algorithmic system with an example.

$$(OR)$$

  (b) Explain Encoders and Decoders with an example.

PART-C

Answer any TWO Questions:-   **2 X 20 = 40**

16.(a) If I is the set of integers and if there is a relation R in I such that a R b iff

   a – b is an even integer, then R is an Equivalence Relation

  (b) Briefly explain lattices and posets with an example for each.

17. (a) Show that $\neg (p \lor (\neg p \land q))$ and $\neg p \land \neg q$ are logically equivalent by developing a

   series of logically equivalences.

  (b) Explain the Bipartite Graph and Isomorphic Graph with suitable

   examples.

18. (a) Explain the types of Binary Tree Traversals with suitable examples.

   (b) Explain Cyclic Groups and Cosets with a suitable example for each.

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