#### No. of Printed Pages : 4

**CS-07** 

# ADCA / MCA (II Yr.)

## **Term-End Examination**

#### December, 2011

### **CS-07 : DISCRETE MATHEMATICS**

Time : 3 hours

Maximum Marks: 75

**Note :** Question No. 1 is compulsory. Attempt any three from the rest.

- **1.** (a) Express PVQ using  $\uparrow$  only. **3** 
  - (b) Write the output of following gating 4 network.



(c) Define the following terms with suitable example. 2+2=4

- (i) cut set (minimum)
- (ii) Tree

**CS-07** 

P.T.O.

- (d) What conditions should a graph satisfy to 3 have a Euler circuit? Explain.
- (e) Let  $f(x) = x^2$  and g(x) = 2x. Find fog(x) and 2 gof(x)
- (f) Let A = { 1,2,3,4,5} Let R be a relation on A such that aRb iff a+b<8. Find R and check if it is</li>
  - (i) refelexive (ii) symmetric
  - (iii) transitive

(g) Let 
$$f = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 1 & 3 \end{pmatrix}$$
 and  $g = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 3 & 1 \end{pmatrix}$ 

find fg and gf.

(h) Make the truth table for full binary 3 substractor.

2

2

- (i) Show that (D(30), gcd, lcm) is uniquely 3 complemented lattice.
- (j) Design a even parity generator for 2 bit 2 message.

2. (a) Express 
$$\lor, \land \leftrightarrow$$
 using  $(\neg, \rightarrow)$  only 3

(b) Obtain the principal disjunctive normal 5 form of following expression.

 $(P \to (P \to Q) \land \neg (\neg Q \lor \neg P))$ 

- (c) Write the following sentences using predicate logic.
  - (i) Every gold ornament glitters. 1
  - (ii) There is something which glitters but 2 is not gold ornament.
  - (iii) Once dead one is dead for all time to 2 come.
- (d) Explain modus tollens.

**CS-07** 

- (a) Explain the concept of isomorphic graphs 3
  with the help of suitable example.
- (b) Write adjacency matrix for following graph 4 and check whether it is connected.



(c) Use Prim's algorithm to find minimal 6 spanning tree of following graph.



- (d) Explain closure of a graph with suitable 2 example.
- (a) Define fuzzy sets to express the human age 6 concepts (child, young, middle-aged, old, very old).
  - (b) Define the concept of hashing function and 5 explain its utility in computer science.
  - (c) Explain how will you identify
    - (i) reflexive relation
    - (ii) symmetric by visualising the relation matrix.

**CS-07** 

4.

3

P.T.O.

2

3.

- (d) Make Venn diagram for A B
  - (i) When BCA
  - (ii)  $A \cap B \neq \phi$
- 5.
- (a) What is a partial order relation? Define Poset. Show that (1,≥) is a poset. (Where I is a set of integer and ≥ is normal comparision operator between integers e.g. 8≥6).

1

1

5

3

(b) For the following switching cirucuit write **4** the boolean expression.



- (c) Compute  $91_{10} 47_{10}$  using 2's complement 3 arithmetic.
- (d) Design a finite state machine to accept the language (ab+ba)c over the alphabet  $\Sigma = \{a,b,c\}$

**CS-07**