

Total No. of Questions : 4]

SEAT No. :

PA-20

[Total No. of Pages : 2

[5931]-30

S.E. (Computer Engineering and AI & DS and Computer  
Science & Design Engineering)

DISCRETE MATHEMATICS

(2019 Pattern) (Semester - I) (210241)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable data, if necessary.

Q1) a) Let  $U = \{1, 2, 3, \dots, 10\}$ ,  $A = \{2, 4, 6, 8, 10\}$ ,  $B = \{1, 3, 5, 7, 9, 10\}$  [6]

Find:

- i)  $(A \cup B)'$
  - ii)  $(A \cap B)'$
  - iii)  $(B)'$
  - iv)  $(B-A)'$
- b) Let  $p$  be "Mark is Rich" and  $q$  be "Mark is happy" write each of following in symbolic form [4]
- i) Mark is poor but happy
  - ii) Mark is neither rich nor happy
  - iii) Mark is either rich or happy
  - iv) Mark is Rich and not happy
- c) Explain terms Tautology and Contradiction in truth table with an example. [5]

OR

Q2) a) By using mathematical induction show that  $1+2+3+\dots+n = n(n+1)/2$  for all natural number values of  $n$ . [6]

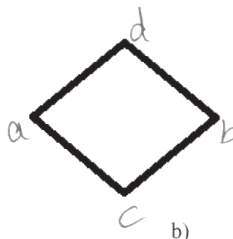
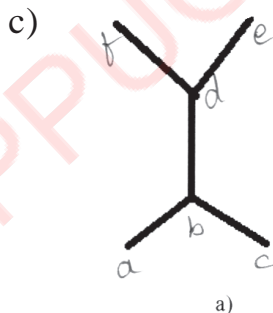
P.T.O.

- b) Explain following terms with example. [4]
- Symmetric difference between set
  - Union of set
  - Intersection of Set
  - Subset of a Set
- c) A college Records gives following information : 119 students enrolled in Introductory computer science, 96 of them took data structures, 53 took foundations, 39 took assembly language, 31 took both foundation and Assembly language, 32 took both data structures and Assembly language, 38 took data structures and foundations and 22 took all of three courses is this information correct? Why? [5]

- Q3)** a) What is Equivalence relation? Explain properties of binary relations. [5]
- b) Let  $A = \{1, 2, 3, 4\}$  and  $R = \{(1, 2), (2, 4), (1, 3), (3, 2)\}$ , Find transitive closure of relation R using Warshall's algorithm. [5]
- c) Let  $A = \{1, 2, 3, 4, 12\} = B$ , and let  $aRb$  if  $a$  divides  $b$ , Write a relation and draw it's Hasse diagram. [5]

OR

- Q4)** a) Let  $f(x) = 2x + 3$ ,  $g(x) = 3x + 4$ ,  $h(x) = 4x$  find  $g \circ f$ ,  $f \circ g$ ,  $h \circ g$ ,  $g \circ h$  [5]
- b)  $A = \{1, 2, 3, 4, 5, 6\} = B$   
 $R = \{(i, j) \mid |i - j| = 2\}$   
 Find whether R is equivalence relation or not [5]



Find whether above posets are lattices or no? [5]

