BCA First Semester Examination, Dec-2018

FOURTH PAPER

Discrete Mathematics

Paper Code-1741

Time Allowed: Three Hours **Maximum Marks.70**

(1) No supplementary answer book will be given to any candidate. Hence the candidates should write the answers precisely in the main answer book only.

(2)All the parts of one question should be answered at one place in the answer book.

(Attempt all six questions.)

Part A and Part B are compulsory (Question No. 1& 2) & Part C (Question No. 3, 4, 5 & 6) has internal choice.

Part-A

1. Answer any 10 questions. Each question carries 1 mark. **10x1= 10**
(Words limit up to 20 words each)

a) If $A = \{1,2,5,6,7\}$ and $B = \{5,7,8,11\}$, then find $(A - B)$.
b) Find $(A \cup \emptyset)$ where $A = \{1,2,3,4\}$
c) Convert $(10101)_2$ into decimal form.
d) Find the number of different permutations of the word "ANKIT".
e) If $n_{C_{12}} = n_{C_8}$, then find the value of 'n'.
f) Find the total number of relations on the set $A = \{a, b\}$.
g) Find the truth table of $(p \vee q)$.
h) Find the truth table for $(p \wedge \backsim p)$.
i) Write associate laws for p, q and r.
j) Find the number of vertices in the graph K_5.
k) Draw the graph $K_{2,3}$.
l) Find the number of edges in the graph C_5.

2. Answer all the questions. Each question carries 5 marks. **4x5 = 20**
(Words limit up to 50 words each)

a) Suppose $S = \{1,2,34\}$ then find the power set of S. Also find the number of subsets of S with 3 elements.
b) How many integers are divisible by 3 or 5 among integers 1 to 1000.
c) Show that the proposition $[\{(p \rightarrow q) \wedge \sim q\} \rightarrow \sim p]$ is a tautology.
d) Show that the complete graph K_5 is nonplanar.

Part-II

Unit-I

3. (a) Evaluate $(162)_8 + (537)_8$ in octal number system. **5**
(b) Find $(10110)_2 - (01101)_2$ in binary number system. **5**

P.T.O.

OR

(a) Evaluate the set $(A \cup B) \cap (A \cup \bar{B})$ using Venn diagram. **5**

(b) Let $A = \{a, a, a, b, b, c\}$ and $B = \{a, a, b, b, b, d, d, d, d\}$ be two multi sets. Find $(A \cap B)$ and $(A - B)$. **5**

Unit-II

4. (a) Prove the following by the principle of Mathematical induction. **5**

$$1+3+5+\ldots\ldots\ldots\ldots\ldots+(2n+1) = n^2$$

(b) State Pigeon Hole principle with example. **5**

OR

(a) Let $A = \{1,2,3,4\}$ and $R = \{(a, b) | a \ divides \ b\}$ be a relation on the set A. List all the elements of R. **5**

(b) Let $A = \{1,2,3,4\}$ and $B = \{x, y, z\}$ and $R = \{(1, y)\ (1, z)\ (3, y)\ (4, x)\ (4, z)\}$ be the relation from A to B. Find R^{-1} of R. **5**

Unit-III

5. (a) Show that the proposition $[(p \vee q) \wedge \sim p] \rightarrow q$ is a tautology. **5**

(b) Using truth table, prove that $p \vee (q \wedge r) = (p \vee q) \wedge (p \vee r)$ **5**

OR

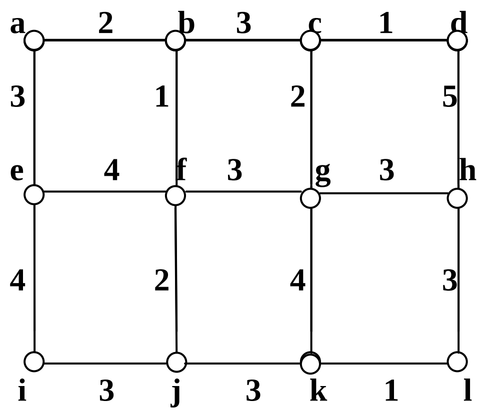
(a) Show that the propositions $\sim (p \wedge q)$ *and* $(\sim p \vee \sim q)$ are logically equivalent. **5**

(b) Show that the propositions $(q \rightarrow p)$ *and* $(\sim p \rightarrow \sim q)$ are logically equivalent. **5**

Unit-IV

6. (a) Show that each tree has either one or two centers. **5**

(b) Find minimum spanning tree for the following graph. **5**



OR

(a) Find the condition for the complete bipartite graph $K_{m,n}$ to be Eulerian graph. **5**

(b) Draw all the trees with five vertices. **5**

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