

BACHELOR OF COMPUTER APPLICATION  
SECOND SEMESTER  
DISCRETE MATHEMATICS  
BCA-204

**SET  
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 1hr. 30 mins.

Full Marks: 35

Time: 15 mins.

( Objective )

Marks: 10

Choose the correct answer from the following:

1 × 10 = 10

- Which is the associative law for the three sets A, B and C?
  - $(A \cup B) \cup C = A \cup (B \cup C)$
  - $(A \cup B) \cup C = (A \cup B) \cap C$
  - $(A \cup B) \cup C = (A \cap B) \cup C$
  - None of these
- Which one of the following is correct statement?
  - $N \subset Z \subset Q$
  - $Q \subset R$
  - Both a and b
  - None of these
- Which of the following is/are De Morgan laws?
  - $(A \cup B)^c = A^c \cap B^c$
  - $(A \cap B)^c = A^c \cup B^c$
  - Both a and b
  - None of these
- Which one of the following is Idempotent law?
  - $A \cup A = \emptyset$
  - $A \cup A = A$
  - $A \cup \emptyset = A$
  - None of these
- Which one of the following is identity law?
  - $A \cup A = \emptyset$
  - $\emptyset \cup \emptyset = A$
  - $A \cup \emptyset = A$
  - None of these
- Which of the following is/are Commutative laws from the following propositions?
  - $(p \vee q) \equiv (q \vee p)$
  - $(p \wedge q) \equiv (q \wedge p)$
  - Both a and b
  - None of these
- Which one of the following is correct equivalence involving Bi-conditional?
  - $p \leftrightarrow q = (p \rightarrow q) \leftrightarrow (q \rightarrow p)$
  - $p \leftrightarrow q = (p \rightarrow q) \rightarrow (q \rightarrow p)$
  - $p \leftrightarrow q = (p \rightarrow q) + (q \rightarrow p)$
  - $p \leftrightarrow q = (p \rightarrow q) \wedge (q \rightarrow p)$
- Which one of the following is correct equivalence involving Bi-conditional?
  - $\sim (p \leftrightarrow q) = p \leftrightarrow \sim q$
  - $\sim (p \leftrightarrow q) = \sim p \leftrightarrow q$
  - $\sim (p \leftrightarrow q) = p \wedge \sim q$
  - $\sim (p \leftrightarrow q) = p \leftrightarrow q$
- Degree of pendant vertex is:
  - 0
  - 1
  - 2
  - 3

10. Calculate the number edges of complete graph of 4 vertices.
- a. 2
  - b. 4
  - c. 5
  - d. 6

-- --- --



**( Descriptive )**

Time : 1 hr. 15 mins.

Marks : 25

[ Answer question no.1 & any two (2) from the rest ]

1. Construct the truth table from the following propositions and determine whether it is tautologies or contradictions. 5

$$\{(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)\} \rightarrow r$$

2. a) Construct the truth table from the given propositions. 5

$$\sim (q \rightarrow r) \wedge r \wedge (p \rightarrow q)$$

- b) Construct the truth table from the given propositions. 5

$$(p \rightarrow (q \rightarrow s)) \wedge (\sim r \wedge p) \wedge q \Rightarrow r \rightarrow s$$

3. a) In a class of 35 students, 24 like to play cricket and 16 like to play football. Also each students likes to play at least one of the two games. How many students like to play both cricket and football? 5

- b) Without using truth table prove that: 5

$$(\sim p \vee q) \wedge (p \wedge (p \wedge q)) = p \wedge q$$

4. a) In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee? 5

- b) There are 200 individuals with a skin disorder, 120 had been exposed to the chemical A, 50 to chemical B and 30 to both the chemicals A and B. Find the numbers of individuals exposed to chemical A but not chemical B? 5

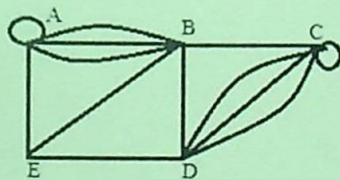
5. a) Write down the definitions of the following: 2+2+1=5

i) Complete graph

ii) Regular graph

iii) Degrees of a graph

- b) Find the number of vertices, the number of edges and the degree of each vertex from the following undirected graphs. Also verify the Handshaking theorem. 5



= = \*\*\* = =