

BCA 204 : **DISCRETE MATHEMATICS**

Duration: 2 Hours

Total Marks: 50

**INSTRUCTIONS:**

- I. Figures to the right indicate maximum marks
- II. Start each answer on a fresh page.
- III. Non scientific, non programmable calculator allowed.
- IV. Graph paper will be provided on request

**1. Answer the following**

**A. Define the following**

[4 Marks]

- i. Partial order relation
- ii. Regular expression

**B. Perform the following operations on binary numbers**

[6 Marks]

- i.  $1100011 + 111011$
- ii.  $10001 - 1111$
- iii.  $1010 \times 100$

**2. Answer the following**

[5x2=10 Marks]

- a. State any two basic theorems of Boolean Algebra
- b. Let  $A = \{1, 2, 3\}$  and a relation on A be  $R = \{(1, 1), (1, 2), (2, 1), (2, 2), (2, 3), (3, 3)\}$ . Verify whether R is
  - i. Reflexive
  - ii. Not transitive
- c. Find the inverse of  $f(x) = 2x - 3$
- d. Convert  $(6592)_{10}$  to hexadecimal form
- e. Construct the truth table for  $(p \wedge q) \rightarrow p$

**3. Answer any two of the following**

[10 Marks]

**A. State the De'Morgan's laws in set theory and verify one of them for**

$X = \{1, 2, 3, 4, 5\}$ ,  $A = \{1, 2\}$  and  $B = \{2, 3, 4\}$

**B. Write a short note on NOR and NAND gate**

**C. How many 5 digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6 such that**

- i. No digit is repeated
- ii. Repetition of digits is allowed
- iii. Number formed is even
- iv. Number formed ends with 3.