

**BACHELOR OF COMPUTER
APPLICATION I YEAR
EXAMINATION, 2010**

Paper — BCAD-103

COMPUTER MATHEMATICS

Time : 2½ Hours

Maximum Marks : 70

*(Write your Roll No. at the top immediately
on receipt of this question paper.)*

*Answer all Sections as per instructions given
in each Section .*

SECTION - I (1 × 10 = 10)

Answer ALL questions.

1. Write the following set into tabular form :
 $A = \{x \mid 3x^2 - 12x = 0, x \text{ is a natural number}\}$.
2. If Set A is a subset of Set B, we can write it as _____.
3. If $A = \{a, b\}$, $B = \{2, 3\}$, $C = \{3, 7\}$
Find the value of $A \times (B \cap C)$
4. If $f: X \rightarrow Y$ and $g: Y \rightarrow Z$ are one - one onto mapping,
prove that
 $g \circ f: X \rightarrow Z$ is one - one.

P.T.O.

5. A graph is said to be a subgraph of graph G if and only if _____.
6. If G is a connected planar graph with e edges, V vertices and r regions, then as per Euler's formula for connected planar graph _____.
7. Find the order of code in the recurrence relation $a_n + a_{n-1} = n^2$.
8. If P : $1 + 1 = 3$
Q : A decade is 10 years
then $p \wedge q$: $1 + 1 = 3$ and a decade is 10 years (T/F)
9. Write the negation of the following statement. "No Politicians are honest."
10. Draw the circuit representing the Boolean function, $a \wedge (b \vee c)$

SECTION - II (6 × 5 = 30)

Answer any SIX questions.

11. Show that the following three sets are equal :

$$A = \{x : x \text{ is a letter in the word REAP}\},$$

$$B = \{x : x \text{ is a letter in the word PAPER}\},$$

$$C = \{x : x \text{ is a letter in the word RAPE}\}$$

12. Explain with the help of a Venn diagram

- a) Union of sets
- b) Intersection of sets
- c) Difference of two sets.

13. Solve the following recurrence relation by forward changing method

$$\begin{cases} a_1 = 3 \\ a_n = a_{n-1} + 3 \end{cases}$$

14. Explain the following mapping with diagram:

- a) Onto or surjective mapping.
- b) One to one mapping

15. Define circular relation. Show that a relation is reflexive and circular if it is reflexive symmetric and transitive.

16. If $A = \{1, 2, 3, 4\}$, $B = \{2, 3, 5, 6\}$

and $C = \{4, 5, 6, 7\}$, then verify that

- a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- b) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

17. Simplify the following :

$$(a' \wedge c) \vee (a' \wedge b) \vee (a \wedge b' \wedge c) \vee (b \wedge c)$$

18. Draw the circuit which realises the Boolean function.

$$a \wedge [(b \vee d') \vee (c' \wedge (a \vee d \vee c))] \wedge b.$$

SECTION - III (3 × 10 = 30)

Answer any THREE questions

19. Differentiate the following mapping schemes with the help of diagram.

- Onto or surjective mapping v/s into or injective mapping.
- One-One mapping v/s many-one mapping.

20. What is a set ? Explain the following set with examples.

- Empty set
- Equal set
- Equivalent set
- Finite set
- Power set.

21. State and prove De-Morgan's Laws.

22. In a group of athletic team of Jamia Hamdard, 21 are in the basket ball team, 26 in the hockey team, 29 in the football team. If 14 play hockey and basket ball, 12 play football and basket ball, 15 play hockey and football. 8 play all three games.
- How many players are there in all?
 - How many play only football ?

23. Find the graph that have the following adjacency matrix.

$$\begin{bmatrix} 1 & 2 & 1 & 2 \\ 2 & 0 & 2 & 1 \\ 1 & 2 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{bmatrix}$$