ROLL No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]     Total number of pages:[2]

Total number of questions:07

# B.C.A.1st Sem

# Mathematics-1

## Subject Code:BSBC103

Paper ID:                      (for office use)

Time allowed: 3 Hrs

Max Marks:60

To be specified by paper setter

**Important Instructions:**

- All questions are compulsory
- Assume any missing data
- Additional instructions, if any

## PART A (2×10)

Q. 1.  Short-Answer Questions:

(a) Let A set $A = \{1,2,3,4\}$ and $B=\{x: x \text{ is a positive integer and } x^2 < 18\}$ Is the set A equal to set B? Give reason.

(b) Define the term forest? Give an example.

(c) Construct the truth table of $\sim p \to (q \to p)$

(d) Find the value of $(10.1)^5$ using Binomial theorem.

(e) Solve the recurrence relation $a_r + 2a_{r-1} + a_{r-2} = 0$

(f) Define chromatic number of a graph G.

(g) Give an example of a graph G that has an Euler circuit and also an Hamilonian Circuit.

(h) Define a Regular Graph?

(i) Find the generating function for the sequence $\{1,2,3,4,........\}$

(j) Prove that if R & S are transitive then R∩ S is also transitive.

## PART B (___×5)

Q. 2.  Prove that De-Morgan's Law $(A \cap B)^c = A^c \cup B^c$

Q. 3.  Use induction method to prove that $1+4+7+------+(3n-2) = \frac{n(3n-1)}{2}$

Q. 4.  Prove that a graph G has an Hamiltonian circuit of $\geq \frac{n^2-3n+6}{2}$ ; n is number of vertices and e is number of edges.

Q. 5.  Prove that the following are equivalent for graph G
(a) G is 2-Coluorable (b) G is Bipratite (c) Every cycle of G has even Length.

Q.6. Show that $A \cup (B - C) = (A \cup B) - (C - A)$

Q.7. Show that $\sim(pv(\sim p \wedge q))$ & $(\sim p \wedge (-q))$ are logically equivalent.