2020
COMPUTER SCIENCE (Honours)
Paper : DC - 1
(Discrete Mathematics)
(CBCS)

Full Marks : 32   Time : Two Hours

The figures in the margin indicate full marks.

Group - A

Answer any *six* questions.   2×6=12

1. (a) State Master Theorem.

   (b) State the Principle of Inclusion and Exclusion.

   (c) What is tautology?

   (d) Define Uncountable Infinite Set.

   (e) What is Pigeonhole Principle?

   (f) What is Gray code?

   (g) What is Hypothetical Syllogism? Explain with example.

   (h) What is Euler graph?

Group - B

Answer any *two* questions.   10×2=20

2. (a) Use characteristic root method to solve the following recurrence relation $a_n = 3a_{n-1} + 4a_{n-2}$, where $a_0 = 0$ and $a_1 = 5$. Hence find a_8.

   (b) Define Converse, Inverse and Contrapositive.   5+2+3=10

3. (a) Show that $\{(p \wedge \sim q) \to r\} \to \{(p \to (q \vee r)\}$ is a tautology.   5+5=10

   (b) Prove that the number of vertices in a binary tree is always odd.

4. (a) What is isomorphic graph? Explain with example.

   (b) What do you mean by adjacency matrix and incidence matrix? Use them to represent the following graph.   (2+2)+(1+1)+(2+2)=10