

B.Sc. Semester-VI Examination, 2022-23**COMPUTER SCIENCE [Programme]**

Course ID : 61518 Course Code : SP/CSC/601/DSE-1B

Course Title : Discrete Structure

Time : 2 Hours

Full Marks : 40

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer any **five** questions: $2 \times 5 = 10$

- $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 6\}$. Find $A \cup B$ and $A \cap B$.
- What is countable infinite set? Give example.
- Write down the definition of bijective mapping.
- What do you mean by a graph? Explain.
- What is the formula of "Principle of Inclusion and Exclusion"?
- What is binary relation? Give example.
- What do you mean by Euler path?
- What is tautology?

i) Express factorial computing as a recurrence relation.

j) What is symmetric relation? Give example.

2. Answer any **four** questions: $5 \times 4 = 20$

- Explain bijective relation with example. What is closure property?
- Show that for any graph the number of odd degree vertices is always even.
- Solve the recurrence relation $a_n = 3a_{n-1} + 2$, $a_0 = 1$.
- What is Hamiltonian path and Hamiltonian circuit? Explain.
- Write Kruskal's algorithm for finding MST.
- In a group of 5 boys and 6 girls, 4 children are to be selected. In how many different ways they can be selected such that at least two girls should be there?

3. Answer any **one** question: $10 \times 1 = 10$

- In how many different ways the letters of the word 'VENUS' can be arranged so that the vowels come together? In a class, 10 boys have Dell laptop, 10 boys have HP laptops and 5 boys have both Dell and HP laptops. How many boys are there in the class? $5 + 5$

- b) What do you mean by a spanning tree? Prove that the sum of degrees of all vertices in a graph G is twice the number of edges in G . A graph G has 21 edges, 3 vertices of degree 4 and other vertices are of degree 3. Find the number of vertices in G . $2+5+3$
