BCA / 3rd Semester

Discrete Structures

Subject Code: BCAP1-314(Regular)

Time allowed: 3 Hrs

Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)   **ALL COs**

Q.1 Answer in brief:

(a) What is a partial order relation? Give an example.

(b) Give an example of a graph that has Euler circuit as well as a Hamiltonian circuit.

(c) Define the terms (i) Regular graph (ii) sub graph.

(d) Does there exists a simple graph with 15 vertices, each of degree five?.

(e) Define preorder traversal of a tree with an example.

(f) What do you mean by union of two sets?

(g) What do you mean by tautology?

(h) Explain the difference between a field and skew field.

(i) Define a function.

(j) How many ways can the letters in word MISSISSIPPI can be arranged?

PART B (5×8)

Q.2 *Solve* $s_n - 4s_{n-1} + 3s_{n-2} = n^2.$

OR

(i)   Define Euler graph.
(ii) Define Hamiltonian graph.
(iii) Define chromatic number.
(iv) Define a tree.

Q.3. State and prove Euler's formula of graph.

OR

Solve $s_{n+2} - 7s_{n+1} + 12s_n = 0$ *for* $n \geq 0,\ s_0 = 2, s_1 = 5$ *by generating function method.*

Q.4. Prove that $(p \wedge q) \wedge r = p \wedge (q \wedge r).$

OR

. If $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{1, 2\}$, *then verify that* $A - (A - B) = A \cap B.$

Q.5. State and prove De-Morgan's Laws in set theory.

OR

In a class of 60 boys, there are 45 boys who play cards and 30 boys play carom. How many boys play both games? How many play cards only and how many play carom only?.

Q.6. Define equivalence relation with a suitable example.

OR

Give the truth table for $(p \wedge q) \rightarrow (p \vee q).$