**United College of Engineering and Research, Prayagraj**

**Department of Computer Science and Engineering**

**B.Tech.**

**IIIrd Sessional Examination (2020-21)**

**Semester: IIIrd Branch: CSE/IT**

**Subject Name: Discrete Structure and Theory of Logic Subject Code: KCS-303**

**Time: 2:00 Hours Max Marks: 30**

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| **Section-A** | | | | | | | | |
| **Question**  **No.** | **Question** | | **Max. Marks** | | **CO** | | | **BL** |
| 1 | **Attempt all** | | | | | | | |
| a | Define equivalence class. | | 1 | | CO1 | | L1 | |
| b | Determine the power set P(A) of A = {a, b, c, d}. | | 1 | | CO1 | | L1 | |
| c | Define function. | | 1 | | CO1 | | L1 | |
| d | Define group homomorphism and isomorphism. | | 1 | | CO2 | | L1 | |
| e | Define cyclic group. | | 1 | | CO2 | | L1 | |
| f | Define Field. | | 1 | | CO2 | | L1 | |
| g | Define Pigeon-hole principle. | | 1 | | CO5 | | L1 | |
| h | What is a binary Search tree? Explain with example. | | 1 | | CO5 | | L1 | |
| i | Obtain the generating function for the sequence 4, 4, 4, 4, 4, 4, 4. | | 1 | | CO5 | | L2 | |
| **Section-B** | | | | | | | | |
| 2 | **Attempt all** | | | | | | | |
| a | Draw the Haase diagram of < P({a,b,c}), ⊆ >. Find greatest element, least element, minimal element & maximal element.  OR  Give an example of a lattice which is a modular but not a distributive. | | 3 | | CO3 | | L3 | |
| b | Write the symbolic form and negate the following statements :   * Everyone who is healthy can do all kinds of work. * Some people are not admired by everyone. * Everyone should help his neighbors, or his neighbors will not help him.   OR  Prove that (P˅Q)→(P˄Q) is logically equivalent to P↔Q. | | 3 | | CO4 | | L2 | |
| c | Explain the following terms with examples.   1. Homomorphism and Isomorphism graphs 2. Euler and Hamiltonian Graph 3. Planar and Complete bipartite graph   OR  Find the recurrence relation from yn = A2n + B(–3)n. | | 5 | | CO5 | | L2 | |
| **Section-C** | | | | | | | | |
| 3. | | **Attempt any one** | | | | | | |
| a | | Define preorder, inorder and postorder tree traversal. Give an example of preorder, postorder & inorder traversal of a binary tree of your choice with at least 12 vertices. | | 10 | | CO5 | | L4 |
| b | | Solve the recurrence relation by the method of generating function.  ar-7ar-1+10ar-2 = 0, r≥2, Given a0=3 and a1=3. | | 10 | | CO5 | | L4 |