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

**Department of Computer Science and Engineering**

**B.Tech.**

**IIIrd Sessional Examination (2018-19)**

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

**Subject Name: Discrete Structure and Theory of Logic Subject Code: RCS-301**

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Section-A** | | | | | | | | |
| **Question**  **No.** | **Question** | | **Max. Marks** | | **CO** | | | **BL** |
| 1 | **Attempt all** | | | | | | | |
| a | Define equivalence relation. | | 1 | | CO1 | | L1 | |
| b | Define power set and proper subset. | | 1 | | CO1 | | L1 | |
| c | Define anti-symmetric relation. | | 1 | | CO1 | | L1 | |
| d | Define order of an element. | | 1 | | CO2 | | L1 | |
| e | Define abelian group. | | 1 | | CO2 | | L1 | |
| f | Define Boolean ring. | | 1 | | CO2 | | L1 | |
| g | Define Pigeon-hole principle. | | 1 | | CO5 | | L1 | |
| h | What is pseudo graph? Explain with example. | | 1 | | CO5 | | L1 | |
| i | Obtain the generating function for the sequence 1, 2, 3, 4,……………. | | 1 | | CO5 | | L2 | |
| **Section-B** | | | | | | | | |
| 2 | **Attempt all** | | | | | | | |
| a | Draw the Haase diagram of < D(45), / >. 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 | “If the labour market is perfect then the wages of all persons in a particular employment will be equal. But it always the case that wages for such persons are not equal therefore the labour market is not perfect”. Test the validity of this argument using truth table.  OR  Prove that (P˅Q)→(P˄Q) is logically equivalent to P↔Q. | | 3 | | CO4 | | L2 | |
| c | Explain the following terms with examples.   1. Euler and Hamiltonian Graph 2. Planar and Complete bipartite graph   OR  Find the recurrence relation from yn = A3n + B(–5)n. | | 5 | | CO5 | | L2 | |
| **Section-C** | | | | | | | | |
| 3. | | **Attempt any one** | | | | | | |
| a | | Represent the expressions (x + xy) + (x/y) and x + ((xy + x)/y) using binary trees. Write these expressions in:   1. Prefix notation. 2. Postfix notation. 3. Infix notation. | | 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 |