Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **DISCRETE MATHEMATICS** | **Duration :** | **3hrs** |
| **Sub. Name :** | **17MA2010** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | A survey of 500 television watchers produced the following information: 285 watch football games, 195 watch hockey games, 115 watch basketball games, 45 watch football and basketball games, 70 watch football and hockey games, 50 watch hockey and basketball games and 50 do not watch any of the 3 kinds of games.  i) How many people in the survey watch all the 3 kinds of games?  ii) How many people watch exactly one of the sports? | CO1 | 10 |
| b. | Find *GCD(100, 60)* using Euclidean algorithm and express it in the form of . Also find LCM*(100, 60).* | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Using mathematical induction, show that . | CO3 | 10 |
| b. | Solve  with initial conditions and . | CO2 | 10 |
|  |  |  |  |  |
| 3. | a. | Let A = {1, 2, 3, 4, 5, 6} and the relation R is defined by aRb iff a ≤ b. Find R, domain, range, matrix representation, digraph, indgrees, outdegrees of the relation R. Also find *R2 and R∞* | CO1 | 15 |
| b. | Prove that congruence relation is an equivalence relation. | CO1 | 5 |
| **(OR)** | | | | |
| 4. | a. | Let and R ={(1,2), (2,1), (2,3), (3,4) be the relation defined on A. Find:  (i) reflexive closure (ii) symmetric closure  (iii) transitive closure using Warshall’s algorithm. | CO1 | 16 |
| b. | Let and. Consider the relation and . Compute  and | CO1 | 4 |
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| 5. | a. | Determine whether (D30, | ) is a lattice. Also find complements of each element. | CO5 | 15 |
| b. | Draw the Hasse Diagram of . | CO5 | 5 |
| **(OR)** | | | | |
| 6. | a. | Prove that is complemented lattice, where *X = {1,2,3}.* | CO5 | 14 |
| b. | Construct the truth table and draw the logic diagram for the Boolean polynomial  . | CO5 | 6 |
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| 7. | a. | Use Fleury’s Algorithm to find an Euler circuit for the graph given below: | CO6 | 8 |
| b. | Using Kruskal”s Algorithm, find a minimal spanning tree for the graph given below. | CO6 | 12 |
| **(OR)** | | | | |
| 8. | a. | Construct the tree of the algebraic expression | CO5 | 8 |
| b. | Find the maximal flow in the given network by using labeling algorithm. | CO5 | 12 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Prove that the set *{1, 3, 5, 7}* is an abelian group under multiplication modulo 8 with multiplication table. | CO4 | 10 |
| b. | Letbe a parity check matrix. Determine the (3,6) group code function . | CO4 | 10 |