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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **14MA2010** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DISCRETE MATHEMATICS** | **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. | In a survey of 260 college students, the following data were obtained: 64 had taken a mathematics course, 94 had taken computer science course, 58 had taken business course, 28 had taken both mathematics and business course, 26 had taken both mathematics and computer science course, 22 had taken both computer science and business course and 14 had taken all the three types of courses.   1. How many students had not taken none of the three courses? 2. Of the students surveyed how many had taken only computer science course? | CO 1 | | 10 |
| b. | Compute *GCD(100, 60)* using Euclidean algorithm and also LCM*(100,60).* | CO 1 | | 5 |
| c. | Show that is a tautology. | CO 1 | | 5 |
| (OR) | | | | | |
| 2. | a. | Using mathematical induction show that | CO 1 | 10 | |
| b. | Solve  with initial conditions and. | CO 1 | 10 | |
| 3. | a. | If A = {1, 2, 3, 4, 5} and the relation R is defined by a Rbiff a ≤ b, compute R, domain, range, matrix representation, digraph, indegrees, outdegrees of the relation R. Also find R2, R3 and R∞ | CO 2 | 15 | |
| b. | Prove that is an equivalence relation. | CO 1 | 5 | |
| (OR) | | | | | |
| 4. | a. | If A = {1, 2, 3, 4, 5} andand are the matrices of the relations R and S on A given below. Compute (i), (ii), (iii), (iv) and (v), where , | CO 1 | 8 | |
| b. | If A = {a1, a2, a3, a4, a5} and R is a relation on A whose matrix is.  Compute the transitive closure using Warshall’s Algorithm. | CO 1 | 12 | |
| 5. | a. | If (A = {1, 2, 3, 6}, / ) and ( = P(S),  ), where S = {a, b} are partially ordered sets, prove that the Hasse Diagrams of  and are isomorphic. | CO 2 | 8 | |
| b. | Draw the Hasse Diagram of the poset ({1, 2, 3, 4, 5, 6, 10, 12, 15, 30, 60}, / ). | CO 2 | 12 | |
| (OR) | | | | | |
| 6. | a. | Determine whether (D30, / ) is a lattice. Also find complements of each element. | CO 2 | 14 | |
| b. | Construct the truth table and draw the logic diagram for the Boolean polynomial  . | CO 2 | 6 | |
| 7. | a. | Construct a spanning tree for the connected graph given below. Use ‘c’ as root.  a  b  c  d  e | CO 3 | 10 | |
| b. | Using Kruskal’s algorithm, find a minimal spanning tree for the graph given below.  A  B  C  D  E  F  G  H  18  24  28  27  20  24  35  33  28  32  22  30  12  9 | CO 3 | 10 | |
| (OR) | | | | | |
| 8. | a. | Use Fleury’s Algorithm to find an Euler circuit for the graph given below.  A  B  D  C  E  F | CO 3 | 12 | |
| b. | Compute a maximum flow in the given network by using Labelling Algorithm.  4  3  4  2  2  3    3  5 | CO 3 | 8 | |
|  | | **Compulsory:** |  |  | |
| 9. | a. | Ifis a parity check matrix, determine the (3,6) group code function . | CO 2 | 12 | |
| b. | If is the set of nonzero real numbers and, show that  is an abelian group. | CO 2 | 8 | |

ALL THE BEST