

*…3rd… Sem (Regular & Back)*

Discrete Mathematics(MA-2003)

CSE, IT, CSSE, CSCE, E & CSc

**AUTUMN END SEMESTER EXAMINATION-2018**

……3rd…… Semester B.Tech & B.Tech Dual Degree

**DISCRETE MATHEMATICS**

**MA-2003**

Regular-2017 Admitted Batch )

Time: 3 Hours Full Marks: 50

***Answer any SIX questions including question No.1 which is compulsory.***

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.*

|  |  |  |  |
| --- | --- | --- | --- |
| 1. |  |  | [1x10] |
|  | (a) | Find the contrapositive of the statement "The home team wins whenever it is raining." |  |
|  | (b) | Find the truth value of if where the domain consists of all real numbers. |  |
|  | (c) | Write the generating function for the sequence with |  |
|  | (d) | Let Find all the left coset of in |  |
|  | (e) | Write all the even permutations on the set . |  |
|  | (f) | Determine whether the degree sequence is graphic or not? |  |
|  | (g) | Define Integral Domain and give an example. |  |
|  | (h) | Let and a mapping be defined by Examine if is a homomorphism or not? |  |
|  | (i) | Define Bipartite graph with an example. |  |
|  | (j) | Find the Minimum Spanning Tree of the following graph given below. |  |
|  |  |  |  |
| 2. | (a) | Show that is a tautology using the truth table. | [4+4] |
|  | (b) | Use Rules of inference to show that the hypotheses “Randy works hard”, “If Randy works hard, then he is a dull boy,” and “If Randy is a dull boy, then he will not get the job” leads to the conclusion “Randy will not get the job.” |  |
|  |  |  |  |
| 3. | (a) | Use mathematical induction to show that for all non-negative integers ;  . | [4+4] |
|  | (b) | Let for . Use strong induction to prove that |  |
|  |  |  |  |
| 4. | (a) | Find the solution of the Recurrence relation | [4+4] |
|  | (b) | Use generating function to solve the following recurrence relation |  |
|  |  |  |  |
| 5. | (a) | State and prove Lagrange's theorem. | [4+4] |
|  | (b) | Show that if for all in a group , then is commutative. |  |
|  |  |  |  |
| 6. | (a) | Verify whether that the graphs and are isomorphic or not?  Image result for Pictures of Graph Isomorphism | [4+4] |
|  | (b) | Find the Shortest path from vertex a to vertex z in the given graph using Dijkstra's Algorithm.  C:\Documents and Settings\Rajashree\Desktop\2.jpg |  |
|  |  |  |  |
| 7. | (a) | Find the transitive Closure of the relation on the set , where | [4+4] |
|  | (b) | Draw the Hasse diagram of the poset . Find the maximal, minimal, greatest and least element of the given poset. |  |
|  |  |  |  |
| 8. | (a) | Find the CNF and DNF of the following Boolean function | [4+4] |
|  | (b) | Let be a Ring such that for all in Show that  (i) for all where is the additive identity.  (ii) The binary operation is commutative. |  |
|  |  | \*\*\*\*\* |  |