

*…… Sem (Regular & Back)*

Subject & code

(Branch)

**AUTUMN END SEMESTER EXAMINATION-2018**

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

**DISCRETE MATHEMATICAL STRUCTURES**

**MA 302**

(-……..Admitted Batch & Back)

Time: 3 Hours Full Marks: 60

***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. |  |  | [210] |
|  | (a) | Find the negation of the statement: |  |
|  | (b) | Using truth table prove that |  |
|  | (c) | Determine the truth value of each of the following statements if the domain consists of all integers.  (i) (ii) |  |
|  | (d) | Find the equivalence relation corresponding to the partition set {a,b}, {c}, {d,e}} of the set |  |
|  | (e) | Find the number of positive integers not exceeding that are divisible by either 4 or 9. |  |
|  | (f) | Find generating functions corresponding to the numeric function |  |
|  | (g) | Find the values of the Boolean function represented by |  |
|  | (h) | Give example of a zero-divisors in a ring. |  |
|  | (i) | Define the following terms:   1. Spanning tree. (ii) Bipartite graph |  |
|  | (j) | Find the greatest lower bound and least upper bound of the subset , in the poset |  |
| 2. |  |  |  |
|  | (a) | Show that is a tautology |  |
|  | (b) | Show that the argument form with premises and and conclusion is valid. |  |
| 3. |  |  |  |
|  | (a) | Use mathematical induction to prove that is divisible by 3 whenever *n* is a positive integer. |  |
|  | (b) | Let be a relation on the set Find the transitive closure of R using Warshall’s algorithm. |  |
| 4. |  |  |  |
|  | (a) | Let *R* be a reflexive relation on a set A such that  Show that R is an equivalence relation. |  |
|  | (b) | Let . Show that is a complemeted lattice? Draw its Hasse diagram. |  |
| 5. |  |  |  |
|  | (a) | Find the numeric solution of the recurrence relation with using generating function. |  |
|  | (b) | Find the numeric solution the recurrence relation ; for with |  |
|  |  |  |  |
| 6. |  |  |  |
|  | (a) | Find the sum-of-products expansion for the Boolean function |  |
|  | (b) | For any Boolean algebra , prove that |  |
| 7. |  |  |  |
|  | (a) | Let be a group and Then show that   1. (ii) |  |
|  | (b) | Let be the set of all nonzero real numbers and  Show that is an abelean group. |  |
| 8. |  |  |  |
|  | (a) | Are these following graphs Isomorphic? Justify your answer. |  |
|  | (b) | Using Dijkstra’s algorithm find the shortest path from vertex a to z from the following weighted graph. |  |
|  |  | \*\*\*\*\*\* |  |