

*…… Sem (Regular & Back)*

Subject & code

(Branch)

**AUTUMN END SEMESTER EXAMINATION-2018**

3rd 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.*

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| 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 on the set corresponding to the partition set {a,b}, {c}, {d,e}} |  |
|  | (e) | Find the number of positive integers not exceeding that are neither divisible by 2 nor divisible by 5. |  |
|  | (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:  (i) Spanning tree and (ii) Complete graph |  |
|  | (j) | Find the greatest lower bound and least upper bound of the subset , in the poset |  |
| 2. |  |  |  |
|  | (a) | Show that and are logically equivalent by developing a series of logical equivalences. |  |
|  | (b) | Show that the argument form with premises and and conclusion is valid. |  |
| 3. |  |  |  |
|  | (a) | Use mathematical induction to show that |  |
|  | (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 and find complements of each of its elements. |  |
| 5. |  |  |  |
|  | (a) | Find the numeric solution of the recurrence relation with and using generating function. |  |
|  | (b) | Find the numeric solution of 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  (ii) |  |
|  | (b) | Determine whether the set of positive integers with the binary operation defined by is a semigroup, monoid or nither. If it is monoid specify the identity. |  |
| 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. |  |
|  |  | \*\*\*\*\* |  |