**H.T No**

**Regulations:**

**A17**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 6F302 Date: 18-June-2019 (AN)**

**B.Tech II Year I-Semester External Examination, June-2019 (Supplementary)**

**Mathematical Foundations of Computer Science (CSE and IT)**

**Time: 3 Hours Max.Marks:75**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**Part - A Max.Marks:25**

**Answer all QUESTIONS.**

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| --- | --- | --- |
| 1. | Using the statements:  R: John is Healthy  H: John is clever  Write the following statements in symbolic form.  i) If John is healthy the he is not clever. (ii) John is not healthy but clever. | [3M] |
| 2. | Prove that in a lattice,  if and only if. | [3M] |
| 3. | Express in terms of (NOR) only. | [3M] |
| 4. | Prove that  is an irrational number by contradiction. | [3M] |
| 5. | Construct the truth table for. | [3M] |
| 6. | Is there a graph with degree sequence (1,2,3, 4, 5, 6, 7)? Give reasons. | [2M] |
| 7. | Enumerate the number of non negative integral solutions to the equation. | [2M] |
| 8. | In a connected simple planar graph show that |E| ≤3|V|-6. | [2M] |
| 9. | Draw all non isomorphic posets on a set with three elements. | [2M] |
| 10. | What are Hamiltonian graphs? | [2M] |

**Part – B Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

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| 11. | a) | Show that is a tautology. | [5M] |
|  | b) | Prove that | [5M] |
|  |  |  |  |
| 12. | a) | If is the relation on the set Z of integers defined by and if  *S={(c, d) Z x Z / d = 3c},* find , | [5M] |
|  | b) | Show that from  the  conclusion  follows. | [5M] |
|  |  |  |  |
| 13. | a) | Draw the Hasse diagram for the poset ( I36, / ) draw a poset diagram and determine all maximal and minimal elements where I36 denotes the set of all divisors of 36 and / is divisibility relation. | [5M] |
|  | b) | Suppose that R is an arbitrary transitive reflexive relation on a set A. Prove that the relation E defined by  is an equivalence relation | [5M] |
|  |  |  |  |
| 14. | a) | Show that in a group <G,\*>, for all a, b in G, show that then G must be abelian | [5M] |
|  | b) | Find the left cosets of {[0],[3]} in the group <Z6, +6> | [5M] |
|  |  |  |  |
| 15. | a) | Define an Eulerian graph. Construct if possible, an Euler graph with 6 vertices and 10 edges and justify your answer | [5M] |
|  | b) | Show that x ≡m y where ≡m denotes that x-y is divisible by m, is an equivalence relation and list the equivalence classes | [5M] |
|  |  |  |  |
| 16. | a) | If is digraph then for  iff there is a directed path of length from | [5M] |
|  | b) | "A complete bipartite graph  is planar iff ". prove or disprove. | [5M] |
|  |  |  |  |
| 17. | a) | Explain the concept of isomorphism of graphs with an example. | [5M] |
|  | b) | Show that  is a valid conclusion from the premises,,  and. | [5M] |
|  |  |  |  |
| 18. | a) | Find the number of numbers between 1 and 500 (both inclusive) which are divisible by 3 or 5 or 7. How many of them are divisible by 3 or 7 but not by 5. | [5M] |
|  | b) | How many integral solutions are there where each. | [5M] |

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