**H.T No**

**Regulations:**

**A17**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 6D301 Date: 15-June-2019 (AN)**

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

**DISCRETE STRUCTURES AND GRAPH THEORY (ECM)**

**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.**

|  |  |  |
| --- | --- | --- |
| 1. | Construct the truth table for the formula (*Q Ʌ*(*P→Q*))→*P* | [3M] |
| 2. | Symbolize is the predicate: “A is a father of mother of B” | [3M] |
| 3. | Define a monoid and give an example. | [3M] |
| 4. | Determine the number of non-negative integers less than 109 that contain digit 1. | [3M] |
| 5. | Find a recurrence relation for  digit ternary sequences that have an even number of 0’s | [3M] |
| 6. | What is the largest possible number of vertices in a graph with 35 edges and all vertices are of degree at least 3. | [2M] |
| 7. | Show that | [2M] |
| 8. | Find coefficient of | [2M] |
| 9. | Prove that for any polyhedral graph. | [2M] |
| 10. | State generalized principle of inclusion and exclusion. | [2M] |

**Part – B Max.Marks:50**

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

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| --- | --- | --- | --- |
| 11. | a) | Without constructing the truth table Show that | [5M] |
|  | b) | Show the following using indirect method of proof. | [5M] |
|  |  |  |  |
| 12. | a) | Show that  logically follows from the premises | [5M] |
|  | b) | Prove or disprove the following argument  “All living things are either plants or animals  David’s dog is a living thing but not plant  All animals have heart  Hence David’s dog has heart” | [5M] |
|  |  |  |  |
| 13. | a) | Prove that if the relation R is a partial order on a set A then R-1 is partial order on A. | [5M] |
|  | b) | Let  be semigroups and be semigroup homomorphisms. Then prove that is a semigroup homomorphism from | [5M] |
|  |  |  |  |
| 14. | a) | How many non negative integral solutions are there to | [5M] |
|  | b) | Compute the number of integers between 1 and 1000 that are not divisible by 2, 3, 5 or 7? | [5M] |
|  |  |  |  |
| 15. | a) | How many different license plates are there that involve 1,2 or 3 letters followed by 4 digits. | [5M] |
|  | b) | Solve using generating functions the recurrence relation | [5M] |
|  |  |  |  |
| 16. | a) | In a connected simple planar graph show that |E| 3|V|-6 | [5M] |
|  | b) | Define a Hamiltonian graph. Construct a graph on 6 Vertices which is not Eulerian but Hamiltonian | [5M] |
|  |  |  |  |
| 17. | a) | A committee is to be chosen from a set of 9 women and 5 men. How many ways are there to form a committee if the committee has (i) 6 people, 3 women and 3 men? (ii) Any number of people but equal number of women and men. | [5M] |
|  | b) | Obtain the principal disjunctive normal form of  using its principal conjunctive normal form | [5M] |
|  |  |  |  |
| 18. | a) | Find a recurrence relation and give initial conditions for the number of bit strings of length ‘n’ that do not have two consecutive 0’s | [5M] |
|  | b) | If G=(V,E) is a connected plane graph, show that | V | - | E | + | R | = 2. | [5M] |

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