**SET-2**

**Regulations:**

**A18**



**H.T No**

**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 7F302 Date: 16-Dec-2019 (FN)**

**B.Tech II-Year I-Semester External Examination, Dec-2019/Jan-2020 (Regular)**

**DISCRETE MATHEMATICS (IT)**

**Time: 3 Hours Max.Marks:70**

***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:20**

**Answer all QUESTIONS.**

|  |  |  |
| --- | --- | --- |
| 1. | How many 4 digits number greater than 4000 can be formed from digits 1,2,4,7,8. | [2M] |
| 2. | What is recurrence relation? Derive recurrence relation of tower of Hanoi. | [2M] |
| 3. | Represent the preposition “if you do not study then you will fail in exam” into symbolic form and also its negation. | [2M] |
| 4. | Show that (p->s) can be derived from p->q ,q->r,r->s. | [2M] |
| 5. | Define Lattice and write its properties. | [2M] |
| 6. | What are different Graph Traversals? | [2M] |
| 7. | What are Monoids? | [2M] |
| 8. | Define planar graph and complete graph . | [2M] |
| 9. | Write the truth table for (P↔~Q) ->(P˄Q). | [2M] |
| 10. | How many words of 3 distinct letters can be formed from HONEY? | [2M] |

**Part – B Max.Marks:50**

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

|  |  |  |  |
| --- | --- | --- | --- |
| 11. | a) | Find the number of integers <300 divisible by 5 or 7 or 9 | [5M] |
|  | b) | Expand (3x-y)6 using binomial theorem | [5M] |
|  |  |  |  |
| 12. | a) | Solve recurrence relation an=3an-1+2an-2 for n>=2 ,a0 =1,a1=2 | [5M] |
|  | b) | Using generating function find an in terms of n if a0=1,a1=2 and an+2=4an+1-5an for n>=0 | [5M] |
|  |  |  | [5M] |
| 13. | a) | What is chromatic number? find chromatic number of the following graph | [5M] |
|  | b) | What are spanning trees? Write and explain Prims algorithm. |  |
|  |  |  |  |
| 14. | a) | Obtain principal disjunctive normal form of the following formula.  **P˅(~P→(Q˅(~Q→R)))** | [5M] |
|  | b) | Show the following equivalence without truth table.  **(((P˄Q˄R)→C)˄(R→(P˅Q˅C)))⬄(R˄(P↔Q))→C** | [5M] |
|  |  |  |  |
| 15. | a) | Prove that the following argument is valid  **∀x p(x) →~q(x)**  **¬∃x ((r(x) ˅ s(x))˄ ¬q(x)**  **r(a)**  **∴p(a)** | [5M] |
|  | b) | For the following formulas let the universe be R. Translate each of the following sentence into a formula (using quantifiers)   1. There is a largest number 2. Every positive integer has a square root (do not use square root symbol use only multiplication) | [5M] |
|  |  |  |  |
| 16. | a) | Let x={1,2,3} and f, g, h be functions from x to x given by f={(1,2),(2,3),(3,1)} g={(1,2),(2,1),(3,3)} h={(1,1),(2,2),(3,1)} Find fog, foh, fohog, goh | [5M] |
|  | b) | Write about partial ordering and total ordering relations. | [5M] |
|  |  |  |  |
| 17. |  | Write short notes on: |  |
|  | a) | automatic theorem proving. | [3M] |
|  | b) | Rules of Inference. | [3M] |
|  | c) | Homomorphism. | [4M] |
|  |  |  |  |
| 18. | a) | What is pigeon hole principle? What are its applications? | [5M] |
|  | b) | Find number of positive integer solutions of x+y+z =12. | [5M] |

**-- 00 -- 00 –**