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| Hall Ticket No.: |  |  |  |  |  |  |  |  |  |  |

**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**SRIT R20**

**(AUTONOMOUS)**

II B. Tech II Sem – Continuous Internal Examinations I – Apr 2023 (AY: 2022-2023)

**DISCRETE MATHEMATICS**

**[R204GA05401]**

**(**Common to CSE, CSD & CSM)

**Time: 2 hours** S**ET – 1 Max. Marks: 30**

**Answer the following questions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q. No** | | **Questions** | **Unit** | **Marks** | **CO** | **Cognitive Level** |
| 1 | a) | Construct the truth table for (P∧Q) V (Q ∧R) V (P∧¬R). | I | 2 | CO1 | Understand |
| b) | Define inverse function. | II | 2 | CO1 | Remember |
| c) | Define Algebraic System. | III | 2 | CO1 | Remember |
| **UNIT-I** | | | | | | |
| 2 | a) | Explain the well - formed formulas with an example. | | 4 | CO2 | Understand |
| b) | Illustrate Equivalence Formulas. | | 4 | CO2 | Understand |
| **OR** | | | | | | |
| 3 | a) | Show that (R ∨S) follows logically from the premises (C∨D), (C ∨D) → ¬ H, ¬H →(A ⋀ ¬ B) and (A⋀¬ B) → (R∨S). | | 4 | CO2 | Apply |
| b) | Show that S V R is tautologically implied by (P∨Q) ⋀ (P →R) ⋀ (Q →S). | | 4 | CO2 | Apply |
| **UNIT-II** | | | | | | |
| 4 | a) | Find the transitive closure of the Relation which is represented by: | | 4 | CO3 | Apply |
| b) | Demonstrate the relation a R b if a b in {1, 2, 3, 4}  by using their matrix and Digraph. | | 4 | CO3 | Apply |
| **OR** | | | | | | |
| 5 | a) | Explain the principle of inclusion and exclusion. | | 4 | CO3 | Understand |
| b) | Explain the properties of binary relations with examples. | | 4 | CO3 | Understand |
| **UNIT-III** | | | | | | |
| 6 | Let X = {a, b}and S denote the set of all mapping from X to X. Let us write S = {f1, f2, f3, f4 } where  f1(a) = a f1(b) = b f2(a) = a f2(b) = a  f3(a) = b f3(b) = b f4(a) = b f4(b) = a  Construct Composition table for the Operation | | | 8 | CO4 | Apply |
| **OR** | | | | | | |
| 7 | Illustrate algebraic system and its properties with suitable examples. | | | 8 | CO4 | Apply |

**Prepared by**

Name of the Faculty: Mr. M. Narasimhulu, Mr. G. Chinna Pullaih , Mr. P. Ram Bayapa Reddy,

Signature of the Faculty:

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**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**SRIT R20**

**(AUTONOMOUS)**

II B. Tech II Sem – Continuous Internal Examinations I – Apr 2023 (AY: 2022-2023)

**DISCRETE MATHEMATICS**

**[R204GA05401]**

**(**Common to CSE, CSD & CSM)

**Time: 2 hours** S**ET – 2 Max. Marks: 30**

**Answer the following questions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q. No** | | **Questions** | **Unit** | **Marks** | **CO** | **Cognitive Level** |
| 1 | a) | Define tautology and contradiction. | I | 2 | CO1 | Remember |
| b) | Given A= { 2,5,6}, B={ 3,4,2}, C={ 1,3,4}, find A- B and B – A. Show that A – B ≠ B – A and A – C = A. | II | 2 | CO1 | Understand |
| c) | Classify the Properties of Integer for Addition. | III | 2 | CO1 | Understand |
| **UNIT-I** | | | | | | |
| 2 | a) | Show that (R ∨S) follows logically from the premises (C∨D), (C ∨D) → ¬ H, ¬H → (A ⋀ ¬ B) and (A ⋀¬ B) → (R∨S). | | 4 | CO2 | Apply |
| b) | Illustrate theory of Inference for a statement Calculus. | | 4 | CO2 | Understand |
| **OR** | | | | | | |
| 3 | a) | Compute the principal disjunctive normal form of (¬ P ∧Q) and (P ∧ Q) V (¬ P ∧ R) V ( Q ∧ R). | | 4 | CO2 | Apply |
| b) | Show that S V R is tautologically implied by (P∨Q) ⋀ (P →R) ⋀ (Q →S). | | 4 | CO2 | Apply |
| **UNIT-II** | | | | | | |
| 4 | a) | Let X = {2, 3, 6, 12, 24, 36} and the relation ≤ be such that x ≤ y if x divides y. Draw the Hasse diagram of (X, ≤). | | 4 | CO3 | Apply |
| b) | Let X = {1, 2, 3, 4} and R = { (x, y) | x > y }. Draw the graph of R and give its matrix. Also, specify the type of relation. | | 4 | CO3 | Apply |
| **OR** | | | | | | |
| 5 |  | Calculate Transitive Closure of the following digraph.    Specify the transitive closure in matrix, digraph and relation tabular form. | | 8 | CO3 | Apply |
| **UNIT-III** | | | | | | |
| 6 | a) | Describe about Homomorphism, Semi Groups and Monoids with an example. | | 4 | CO4 | Understand |
| b) | Explain Groups, Subgroups and Abelian Group | | 4 | CO4 | Understand |
| **OR** | | | | | | |
| 7 | a) | Describe Isomorphism and epimorphism. | | 4 | CO4 | Understand |
| b) | Describe endomorphism and automorphism. | | 4 | CO4 | Understand |

**Prepared by**

Name of the Faculty: Mr. M. Narasimhulu, Mr. G. Chinna Pullaih, Mr. P. Ram Bayapa Reddy.

Signature of the Faculty: