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**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**SRIT R20**

**(AUTONOMOUS)**

II B. Tech II Sem – Semester End Examinations – Regular – July 2021

**DISCRETE MATHEMATICS**

**[R204GA05401]**

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

**Time: 3 hours** **Max. Marks: 60**

**PART-A**

(Compulsory Question)

**\*\*\***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1 |  | | | Answer the following: (5 X 02 = 10 Marks) | |
|  | a) | | | Define tautology and contradiction. | |
|  | b) | | | Define absolute complement and relative complement. | |
|  | c) | | | What do you mean by group isomorphism? Give an example. | |
|  | d) | | | In how many ways can a hand of 5 cards be selected from a deck of 52 cards? | |
|  | e) | | | Define planar graph. Give an example. | |
| **PART-B**  (Answer all five units, 5 X 10 = 50 Marks) | | | | | |
|  | | | | | |
| **UNIT-1** | | | | | |
| 2 | a) | Show that S V R is tautologically implied by (P∨Q) ⋀ (P →R) ⋀ (Q →S). | | | **[5M]** |
|  | b) | Obtain the principal conjunctive normal form of the formula given by (**¬** P→R)∧(Q↔P) | | | **[5M]** |
| OR | | | | | |
| 3 | Explain the inference theory for predicate calculus. | | | | **[10M]** |
|  |
| **UNIT-2** | | | | | |
| 4 | What is relation? Explain the properties of binary relations with examples. | | | | **[10M]** |
|  |
| OR | | | | | |
| 5 | a) | | Explain the bijective function. Give an example. | | **[5M]** |
|  | b) | | Explain the inverse function. Give an example. | | **[5M]** |
| **UNIT-3** | | | | | |
| 6 | a) | | Prove that a subset S ≠ Φ of G is a subgroup of < G, \* >, if any pair of elements a, b ∈ S, a \* b -1 ∈ S. | | **[5M]** |
|  | b) | | Show that every cyclic group of order n is isomorphic to the group < Zn, tn>. | | **[5M]** |
| OR | | | | | |
| 7 | Explain the testing for prime numbers with an example. | | | | **[10M]** |
|  |
| **UNIT-4** | | | | | |
| 8 | Explain the enumerating permutations with constrained repetitions. | | | | **[10M]** |
|  |
| OR | | | | | |
| 9 | State and prove binomial theorem. | | | | **[10M]** |
|  |
| **UNIT-5** | | | | | |
| 10 | a) | | Prove that the complete graph of 5 vertices is non-planar. | | **[5M]** |
|  | b) | | Show that a connected graph ‘G’ with ‘n’ vertices has at least ‘n-1’ edges. | | **[5M]** |
| OR | | | | | |
| 11 | a) | | When it can be said that two graphs G1 and G2 are isomorphic? | | **[5M]** |
|  | b) | | Explain the krushkal’s algorithm with an example. | | **[5M]** |

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