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**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**SRIT R19**

**(AUTONOMOUS)**

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

**DISCRETE MATHEMATICS**

**[R204GA05401]**

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

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

**PART-A**

(Compulsory Question)

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| 1 |  | | | Answer the following: (10 X 02 = 20 Marks) | |
|  | a) | | | Construct the truth table for (P∧Q) V(Q ∧R) V (P∧**¬**R). | |
|  | b) | | | What is composition of function? | |
|  | c) | | | What is congruence relation. Give an example. | |
|  | d) | | | Suppose that Florida state university has a residence hall that has 5 single rooms, 5 double rooms, and 3 rooms for 3 students each. In how many ways can 24 students be assigned to the 13 rooms. | |
|  | e) | | | What do you mean by graph isomorphism, show it by example? | |
| **PART-B**  (Answer all five units, 5 X 10 = 50 Marks) | | | | | |
|  | | | | | |
| **UNIT-1** | | | | | |
| 2 | a) | Explain the well - formed formulas. | | | **[5M]** |
|  | b) | Explain Disjunctive Normal Form. | | | **[5M]** |
| OR | | | | | |
| 3 | a) | | Show that S V R is tautologically implied by (P∨Q) ⋀ (P →R) ⋀ (Q →S). | | **[5M]** |
|  | b) | | Demonstrate that R is a valid inference from the premises P → Q, Q →R and P. | | **[5M]** |
| **UNIT-2** | | | | | |
| 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, ≤) . | | **[5M]** |
|  | b) | | Let X= {1,2,3,4,5,6,7} and R= {(x, y) | x – y is divisible by 3}. Show that R is an equivalence relation. Draw the graph of R. | | **[5M]** |
| OR | | | | | |
| 5 | a) | | Explain the recursive function. Give an example. | | **[5M]** |
|  | b) | | Explain lattice and write its properties. | | **[5M]** |
| **UNIT-3** | | | | | |
| 6 | a) | | Explain about homomorphism. | | **[5M]** |
|  | b) | | Define a semigroup and monoid. Give an example of a monoid which is not a group. Justify the answer. | | **[5M]** |
| OR | | | | | |
| 7 | Explain the Fermat’s theorem and Euler’s theorem with an example. | | | | **[10M]** |
|  |
| **UNIT-4** | | | | | |
| 8 | a) | | How many different outcomes are possible by tossing 10 similar coins? | | **[5M]** |
|  | b) | | Find a generating function for ar = the number of ways of distributing r similar balls into n numbered boxes where each box is nonempty. | | **[5M]** |
| OR | | | | | |
| 9 | Explain pigeonhole principle and its applications. | | | | **[10M]** |
|  |
| **UNIT-5** | | | | | |
| 10 | Define K- regular graph. Give examples of 2- regular, 3- regular, 4- regular graphs. | | | | **[10M]** |
|  |
| OR | | | | | |
| 11 | Differentiate between Eulerian graph & Hamiltonian graph with example. And also give an example of a graph which Eulerian but not Hamiltonian. | | | | **[10M]** |
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