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SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)
II B. Tech II Sem – Semester End Examinations – Supplementary – Feb 2023
DISCRETE MATHEMATICS
[R204GA05401]
(Common to CSE, CSD & CSM)

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

PART-A
(Compulsory Question)
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1   Answer the following: (05 X 02 = 10 Marks)
   a)   Show that the formula Q→ (PVQ) is a tautology?
   b)   What is an equivalence relation?
   c)   Define Homomorphism.
   d)   In how many ways can 12 students be arranged in a circle?
   e)   Define Hamiltonian graph?

PART-B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT-1
2   a)   Obtain PDNF PV(~P→(QV(~Q→R))).   **[5M]**
    b)   State and explain Duality Theorem.   **[5M]**
                                   (OR)
3   a)   State and explain the rules that can generate a well formed formula?   **[5M]**
    b)   Show that (x)[P(x) VQ(x)] →(x)P(x) V ∃ $xQ(x)$ by using indirect proof.   **[5M]**

UNIT-2
4   State and explain the principle of inclusion and exclusion along with suitable examples.   **[10M]**
                                   (OR)
5   a)   Define Lattice? Explain the properties of lattice?   **[5M]**
    b)   Draw the Hasse diagram for X={2,3,6,24,36,48} and relation ≤ be such that x≤y, if x   **[5M]**
         divides y?

UNIT-3
6   a)   State Fermat's theorem? Solve 4^{532} mod 11 using Fermat's theorem?   **[5M]**
    b)   State Euler's theorem? Solve 4^{98}mod 35 using Euler's theorem?   **[5M]**
                                   (OR)
7   a)   Prove that <Z_5,$+_5$> is an abelian group of order 5.   **[5M]**
    b)   Define the following terms   **[5M]**
              (i)   Group
              (ii)   Abelion Group
              (iii)   Monoid

UNIT-4
8   a)   How many ways 5 identical apples and 5 identical oranges be distributed among 5   **[5M]**
         people such that each person receive exactly 2 fruits?
    b)   Explain the basic rules of counting with suitable example.   **[5M]**
                                   (OR)
9   a)   Define multinomial theorem. Find number of integers<250 and divisible by 3 or 5 or   **[5M]**
         11?
    b)   Find the coefficients of X^9Y^3 in the expansion of $(X+2Y)^{12}$.   **[5M]**

UNIT-5

10   Explain kruskal's algorithm with suitable example.   **[10M]**

(OR)

11   Define the following and give suitable example for each   **[10M]**
    i. Euler Circuit
    ii. Hamiltonian Circuit.

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