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

SRIT R20

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

II B. Tech II Sem – Semester End Examinations – Regular – Aug 2022

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) Define free and bound variable.
b) What is power set?
c) Define Epimorphism and Monomorphism.
d) How many 9 letter word can be formed by using the letters of the word DIFFICULT?
e) Define Hamiltonian graph.

PART-B

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

UNIT-1

2 a) Construct the truth table for the formula: (P ∧ Q) V ¬ (P ∧ Q) V (P ∧ ¬ Q) V (¬ P ∧ ¬ Q). **[5M]**

b) Show that S ∨ R is tautologically implied by (P∨Q) ∧ (P→R) ∧ (Q→S) using rules of inference. **[5M]**

(OR)

3 Show that $\forall x[p(x) \vee q(x)] \rightarrow \forall x\, p(x) \vee \exists(x) q(x)$ by using indirect proof method. **[10M]**

UNIT-2

4 a) Construct the Hasse diagram representing the partial ordering {(a,b) | a divides b} on {1,2,3,4,6,8,12}. **[5M]**

b) List and explain any four properties of a binary relation. **[5M]**

(OR)

5 a) How many natural numbers N≤1000 are divisible by 2,3 and 5. **[5M]**

b) Let X={1,2,3,4} and R={(1,2),(2,3),(3,4)} be a relation on X. Find the transitive closure of a relation. **[5M]**

UNIT-3

6 a) Find GCD(615, 1080) by using Euclidian algorithm. **[5M]**

b) Prove that $<Z_5,+_5>$ is an abelian group of order 5. **[5M]**

(OR)

7 a) Write an algorithm for testing whether an integer N>1 is prime or not. **[5M]**

b) If a and b are two positive integers then prove that GCD (a,b).LCM(a,b)=a.b? **[5M]**

UNIT-4

8 a) Explain the basic rules of counting with suitable example. **[5M]**

b) In how many ways can 6 men and 6 women be seated in a row **[5M]**
i) if any person may sit next to any other?
ii) if men and women must occupy alternate seats?

(OR)

9 a) Explain the Pigeon Hole principle with an example. **[5M]**

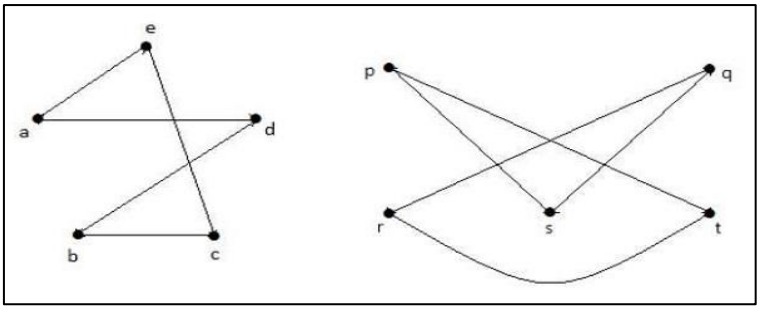
b) Find the coefficients of $x^9 y^3$ in the expansion of $(x+2y)^{12}$. **[5M]**

UNIT-5

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

(OR)

11 a) Verify whether the given graphs are isomorphic or not. **[5M]**



b) Explain the Pigeon Hole principle with an example. **[5M]**

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