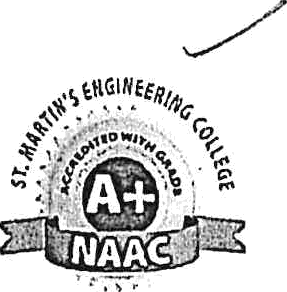
Code No: CS401PC



SMEC-R22

St. **MARTIN'S ENGINEERING COLLEGE**



**UGC Autonomous**

**NBA & NAAC A+ Accredited Dhulapally, Secunderabad — 500100**

**B. Tech II Year II Semester Regular Examinations, AUGUST-2024 DISCRETE MATHEMATICS**

**(COMMON TO CSE (AI&ML), AI&DS, AI&ML)**

**Time: 3 Hours**

**Note:** This Question Paper contains two Parts A and B

Max. Marlts: 60

Q. No

Part-A is compulsory which carries 10 marks. Answer all questions in Part A at one place only. Part-B consists of 10 questions (numbered from 2 to 11) carrying 10 marks each.

Each of these questions is from each unit and may contain sub-questions. For eachquestion there will be an “either” “or” choice, which means that there will be twoquestions from each unit and the student should answer either of the two questions.

# PART — A (10 Marl‹s)

Question DTL Marks

1 a.

b.

O.

d.

e.

f.

g.

h.

i.

j

Q. No

Write the statement in symbolic form “Some real numbCrs are rational”. BTL-1 [1M] Write the statement for contrapositive if p and q are two propositions. BTL-1 [1Mj Given an example for cartesian product. BTL-1 [IM]

Define equivalence relation. BTL- l [IM]

Define Group in algebraic structures. BTL-1 [IM]

What are the properties that satisfy Partial Ordered Set? BTL-1 [IM]

Define lattice with example. BTL-1 [IM]

What are the two basic principles of counting? BTL-1 [IM]

Define Bipartite Graph. BTL-1 [IM]

Find the number of edges for a complete graph K5. BTL-1 [1M]

# PART — B (50 Marl‹s)

Question BTL Marlts

2a. Show that *3xP(x) dxQ(x) six (P{x)* —r *Q{x}}* BTL-3 [5 M]

b. Show that the premises “One student in this class knows how to write BTL-3 [5 M] program in JAVA”, and “Everyone who knows how to write the

programme in JAVA can get a high paying job imply a conclusion “someone in this class can get a high paying job”.

3. Find the PDNF of P V ( P —+ (Q V ( Q R))). BTL-2 [10 M]

4a. If f: A — B and g: B C are one to one and onto functions, prove that *gof*

is also one to one function and onto function.

b. What are the properties of relations explain with an example.

OR

5a. Let A and B be two sets. Show that i) (A H B)ñ A ii) A C (B-A) =&

b. Suppose that the universal set is U = (1, 2, 3, 4,5,6,7,8,9,10} each of these sets can be represented with bit strings where the i" bit in the string is 1 if i is in the set and 0 otherwise. Find the set specified by each of these bit strings.i) 1111001111 ii) 0101111000 iii) 1000000001

6a. Show that G = {1, w, w2} is an abelian group under multiplication where 1, w, w2 are cube roots of unity.

b. Prove group is Abelian if and only if(ab)°—a2b2 for all a, b C G

OR

1. Prove if 6 is abClian group, then for all n, *b G, (a› b)* 2 = n2•b2
2. Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements.

i) Do all the words starts with p ii) Do all the vowels always occur together. iii) Do all the vowels never occur together? iv)Do the Word begin with I and end in P

BTL3 [5 M]

BTL-1 [5 M]

BTL-2 [5 M]

BTL-2 [5 M]

BTL-3 [5 M]

BTL-3 [5 M]

BTL-3 [10 1

BTL-3 [10 M]

OR

9a. State the inclusion and exclusion principle. Hence using the principle find how many faculty members can speak English or Spanish, if 200 faculty members can spealc English and 50 can spealc Spanish, while only 20 can speak both English and Spanish.

1. How many strings of eight English alphabets are there:
   1. That contains no vowels, if letters can bC replaced.
   2. That starts with a vowel, if letters cannot be replaced.

10a. For a simple graph G prove that the number of edges of G is less than or equal to‘(‘\*1’, where n is the number of vertices in the graph.

b. Define Euler's formula. Show that, if G is connected plane graph, then

|V|-|E|+|R|=2.

OR

 Write the algorithm for Kruskal's and Find the minimal spanning tree using Kruskal's Algorithm

BTL-2 [4 M]

BTL-2 [6 M]

BTL-2 [6M]

BTL-2 [4M]

BTL-1 [10 M]

