BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - III Computer Science & Engineering-A&M : WINTER : 2023

SUBJECT : DISCRETE MATHEMATICAL STRUCTURES

Day : Friday

Date : 1/12/2023

Time : 10:00 AM-01:00 PM

W-23935-2023

Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non - programmable **CALCULATOR** is allowed.

Q.1 In a survey of 260 college students, following data were obtained .64 had taken a mathematics course. **(10)**
94 had taken computer science course. 58 had taken a business course. 28 had taken both mathematics and business course. 26 had taken both mathematics and computer science course. 22 had taken both computer science and business course. 14 had taken all 3 types of courses.

(i)How many students were surveyed who had taken none of 3 types of courses?
(ii)How many students had taken only a computer science course?

OR

Q.1 Write note on Quantifiers. Write the following statements in symbolic form. using quantifiers **(10)**

i) All students have taken a course in communication skills.
ii) There is a girl student in the class who is also a sports person.
iii) Some students are intelligent, but not hard working.

Q.2 $A = \{1,2,3,4\}$ and $R = \{(1,2), (2,3), (3,4), (2,1)\}$ find transitive closure of R using Warshall algorithm. **(10)**

OR

Q.2 If f and g be functions from set of integers to set of integers defined by $f(x) = 2x + 3$ and $g(x) = 3x + 2$ Find (f o g) and (g o f). **(10)**

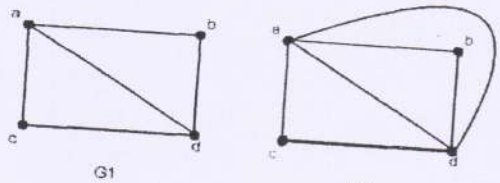
Q.3 Determine the probability P of each event: **(10)**

1. An even number appears in the toss of a fair die.
2. One or more heads appear in the toss of three fair coins.
3. A red marble appears in random drawing of one marble from a box containing four white, three red and five blue marbles.

OR

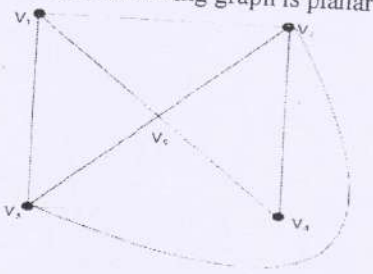
Q.3 Five boys and five girls are to be seated in a row. In how many ways can they be seated if **(10)**
i)All boys must be seated in the five left- most seats.
ii)No two boys can be seated together.

Q.4 Find out Euler Path, Euler Circuit, Hamiltonian Path and Hamiltonian Circuit for following graphs G1 and G2 **(10)**

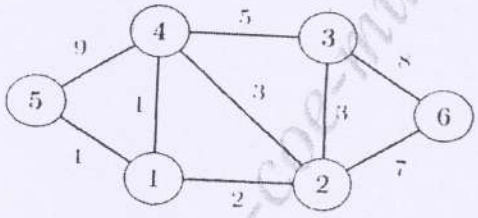


OR

Q.4 Check whether the following graph is planar or not. **(10)**



Q.5 Construct minimum cost spanning tree for following graph using Prim's method and Kruskal's method. **(10)**



OR

Q.5 Construct Huffman tree for the following data **(10)**
1,2,4,5,6,9,10,12

Q.6 Prove that the set A= {0,1,2,3,4,5} is a finite Abelian/ Commutative group under addition modulo 6. **(10)**

OR

Q.6 Define following terms **(10)**
a)Ring
b)Subgroup
c)Congruence relation

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