No. of Printed Pages : **2**

Sl. No.

21CSC1C4L

M.Sc. I Semester Degree Examination, April/May - 2023

COMPUTER SCIENCE

Discrete Mathematical Structures

Time : 3 Hours Maximum Marks : 70

Note : *Answer* ***any five*** *full Questions(Question No.* ***01*** *is* ***compulsory****).*

1. (a) Define the Terms Set, Proper Set, Super Set, Singleton Set, Finite Set, Cardinality of set and Power set with an example. **7**

(b) Construct the truth table for the following : **7**
$(\sim P \wedge (\sim Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R)$

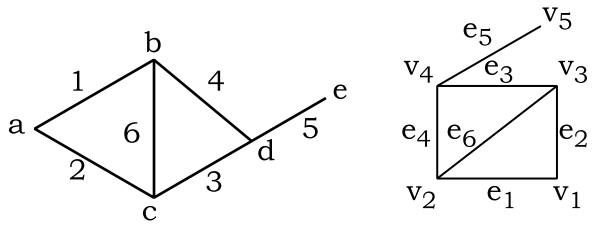
2. (a) By mathematical induction prove that **7**

$$1^2 + 3^2 + 5^2 \cdots\cdots + (2n-1)^2 = \frac{n(2n+1)(2n-1)}{3}$$

(b) Let A={1, 2, 3, 4, 5} R={(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 3), (3, 3), (4, 4), (5, 5)} is R an equivalence relation. **7**

3. (a) Draw all Simple graph of one, two, three and four vertices. **7**

(b) Show that graphs G_1 and G_2 given below are isomorphic. **7**



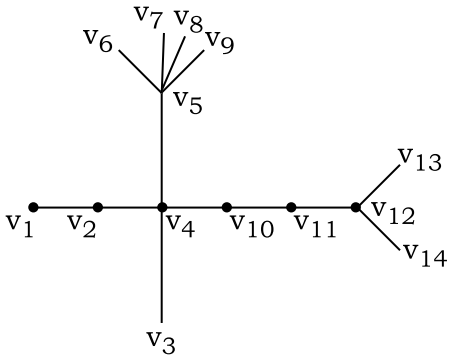
4. (a) Define tree. List out the properties of trees. **7**

(b) For the given tree below find **7**

(i) distance

(ii) ecentricity

(iii) centre



P.T.O.

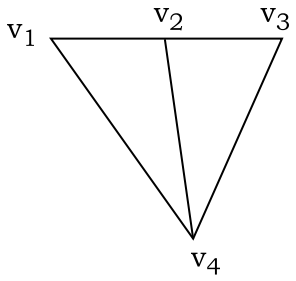
5. (a) Define semigroup. Show that (Z, +) is a commutative semigroup. **7**

(b) Let d be the (6, 2) decoding function. Determine d(y) for the word y in B^6. **7**

6. (a) Define the properties Reflexive Symmetric, Antisymmetric, Asymmetric, Transitive with an example. **7**

(b) Define Hamiltonian graph. Give an example for Hamiltonian cycle. **7**

7. (a) Define Spanning tree. Find all the Spanning tree of the graph G. **7**



(b) Find the weights of the given words : **7**

(i) 01000	(ii) 11100	(iii) 00000
(iv) 11111	(v) 1011	(vi) 0110
(vii) 1110	(viii) 011101	(ix) 11111
(x) 010101		

8. (a) Let P be "It is cold" and Let Q be "It is raining". Give a simple verbal sentence which describes each of the following statements : **6**

(i) ~p
(ii) p/\q
(iii) p\/q
(iv) ~p/\~q

(b) Write short notes on Planar graph. **4**

(c) Write short notes on encoding and decoding. **4**

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