7. Write short note on the following : (15)

(a) Hamiltonian Circuit.

(b) Rooted Tree and Non-Rooted tree.

(c) Infinite set.

Roll No. ..... Total Pages : 4

003401

May 2023

B.Tech. (CE/IT/CSE(AIML)/ 4th Semester

Discrete Mathmeatics (PCC-CS-401/PCC-CSH-401)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) From the given sets, which set(s) follow the Well Ordering Principle–Set of Natural numbers, Set of Real numbers, Set of Even numbers, Set of integers. (1.5)

(b) Three red balls are to be placed in ten indistinguishable boxes but one box can contain exactly one ball. Find the number of distinct ways in which the balls can be placed? (1.5)

(c) Every student of a class participates in at least one of the games being played in the school but none of the students play all the three games. Make the Venn diagram for this. (1.5)

(d) Define monoid in relevance to Algebraic Structure? (1.5)

(e) What do you mean by Planar Graph? (1.5)

(f) What do you mean by Tautology? (1.5)

(g) What do you mean by Connected Directed Graph? (1.5)

(h) In a group of 50 people, How many minimum number of people have their birthday in the same month? (1.5)

(i) What do you mean by Ternary Relation? (1.5)

(j) What do you mean by one-to-one correspondence in the functions. (1.5)

PART–B

2. (a) If $f(x)$ and $g(x)$ be the function from these the set of integers defined as $f(x) = 2x^2 + 2$ and $g(x) = 3x + 3$ then determine following :

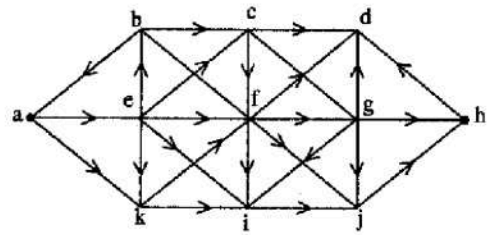
(i) fog of

(ii) go fog (10)

(b) If $f(x)$ be a function from the set {1, 2, 3, 4} to the set $[a, b, c, d]$ with $f(1) = a, f(2) = b, f(3) = c, f(4) = d$, then determine $f^{-}(a), f^{-}(b), f^{-}(c), f^{-}(d)$. (5)

3. (a) What do you mean by prefix codes? (5)

(b) Determine the chromatic number for the given graph. (10)



4. Obtain the, both, CNF and DNF for the given Boolean Function without using the truth table– $(x + y')z$. (15)

5. (a) If R is a binary relation on the set of integers i.e. {..., –2, –1, 0, 1, 2, 3, ...} such that (a, b) G R if and only if $(a - b) \geq 1$) then determine whether the relation R is (10)

(i) Reflexive.

(ii) Symmetric.

(iii) Antisymmetric.

(iv) Transitive.

(b) Define Partial Ordering Relation and Equivalence Relation. (5)

6. (a) Find the Eulerian path in the given graph. (10)