IT

WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Vishrambag, Sangli – 416415

Second Year B.Tech. Computer Science and Engineering
Re-Exam, ODD SEMESTER, AY 2022-23
Discrete Mathematics (6CS201)

Re-Exam

Day & Date: Tuesday, 05/09/2023 Time : 2.00 pm to 5.00 pm

PRN: _____

Max Marks: 100

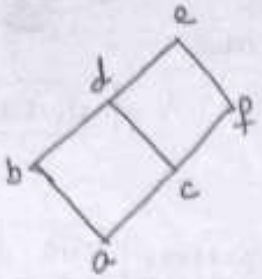
IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.
h) **Show all the steps to the solution.**

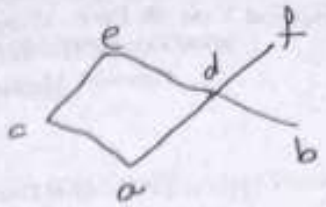
Text on the right of marks indicates course outcomes (Only for faculty use)

			Marks	
Q1	A)	Define the following and give proper example of each 1. Complement of set 2. Power Set 3. Subset	6	CO1
	B)	Let p and q be the propositions "The result is decided" and "The admission has started," respectively. Express each of these compound propositions as an English sentence. Consider P and Q has truth value T and F respectively, find out what will be the truth value of each of the following. 1. $\neg p \wedge q$ 2. $\neg q \rightarrow \neg p$ 3. $\neg p \rightarrow \neg q$ 4. $\neg q \vee (\neg p \wedge q)$	6	CO1
	C)	Define functionally complete set of connectives. Justify why it is called as functionally complete set of connectives.	5	CO1
	D)	Prepare the truth table for the following: 1. $(p \leftrightarrow r) \vee (q \leftrightarrow p)$ 2. $(p \wedge \neg q) \rightarrow (r \wedge p)$	6	CO1

Q2 A) Find upper bound, lower bound, least upper bound and greatest lower bound of the following hasse diagrams with respect to given subsets.



- B={c,d}
- A={a,b}



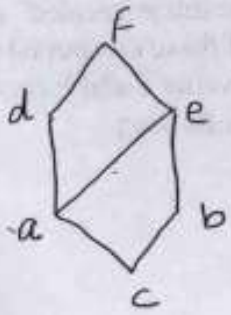
- A={a,c,f}

B) If relation R and S are reflexive , symmetric and transitive, show that R ∩ S is also reflexive , symmetric and transitive. 5

C) Check whether the following are equivalence relation on set of real numbers. Justify your answer with proper examples. 6

1. R1= { (a,b) | a-b is odd number}
2. R2= { (a,b) | a-b is divisible by 5}

D) Check if following is the distributive lattice. 4



Q3 A) Elaborate with the help of suitable example of each : 8 CO1

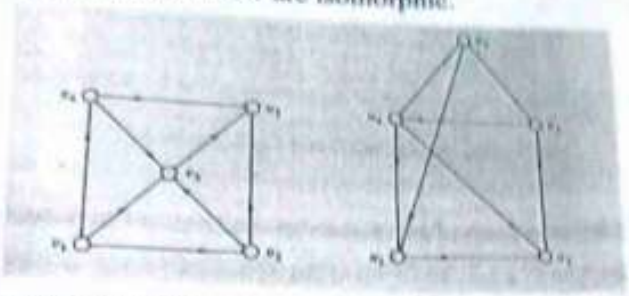
1. Closure of group
2. Semi Group
3. Monoid
4. Cyclic Group

B) Check which of the properties of group are followed in the below example , also conclude if it's a group or not? 8 CO2

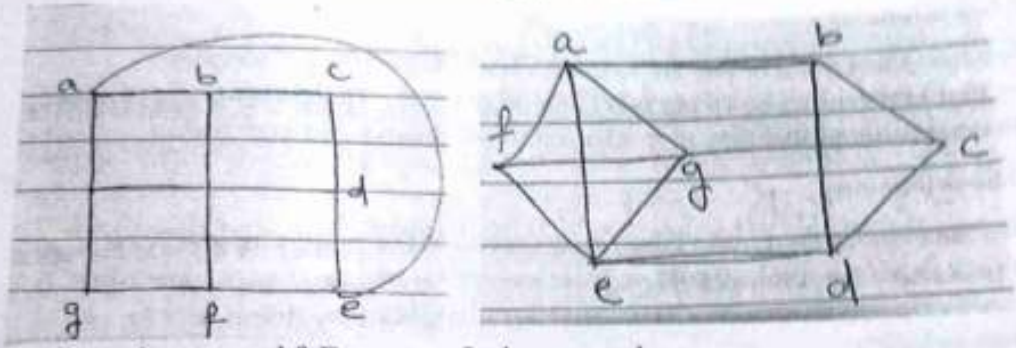
$\{1, 3, 5, 7, 9, 11, 13\}, X_{14}$

$\{0, 2, 3, 4, 6, 8\}, +_9$

C) Show that the diagraph shown below are isomorphic. 4 CO3



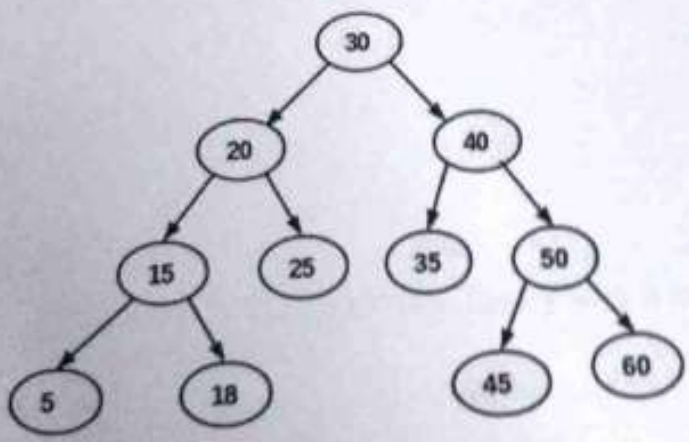
D) What is Euler graph and Hamiltonian graph? Find out which one of the following graph is Euler's graph or Hamiltonian graph or both. 6 CO3



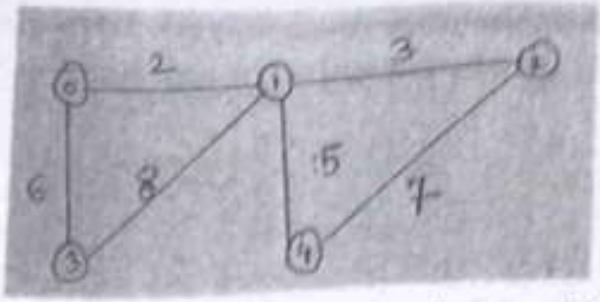
E) What is a planar graph? Draw any 2 planar graphs . 4 CO3

If there are 20 vertices each of degree 3, then into how many regions does this planar graph splits the plane?

Q4 A) What is 3-array tree and complete tree? Give example of each. Give the pre order, in order and post order traversal of following tree. 6 CO3



B) Find the minimum spanning tree using Prim's algorithm. Give step by step solution. 5 CO3



C) A message M of 100 characters has following distribution of frequency of letters: A=50, B=10, C=30, D=5, E=3, F=2. Find the Huffman code to represent these letters by showing all the steps to the solution.

Q5 A) Solve the following

- How many anagram of the word ASSACINATION are possible?
- Out of 40 students, 15 are boys and 25 are girls. If 5 students are selected, what is the probability that selection will have 3 boys and 2 girls.

B) Solve the following:

- 3 Dice has been rolled , how many ways are there of getting at least 5?
- In a sack there are total 10 pens in which 6 are Orange and 4 are Blue. 2 Pens are selected from a box, what is the probability that it will be of Orange color?

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