WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Vishrambag, Sangli – 416415

Second Year B.Tech. Computer Science and Engineering
MSE, ODD SEMESTER, AY 2023-24
Discrete Mathematics (6CS201)

MSE

Day & Date: Friday, 22/09/2023 Time : 3.00 pm to 4.30 pm

PRN: _____

Max Marks: **30**

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 steps to the solution.**

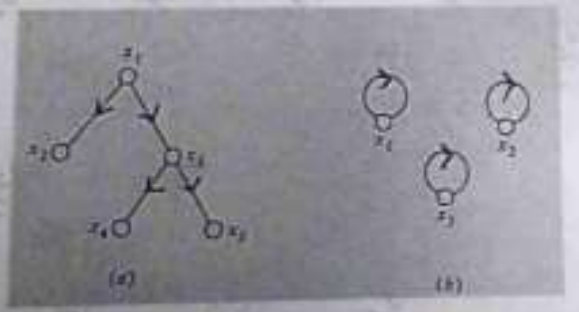
Text on the right of marks indicates course outcomes (Only for faculty use) Marks

Q1 **A)** Using truth tables examine whether the following statement patterns are tautology, contradiction or contingency. CO1 **5**

- $[(p \vee q) \vee r] \leftrightarrow [p \vee (q \vee r)]$
- $(p \vee q) \wedge (p \vee \sim r)$

B) Find Conjunctive Normal Form (CNF) of $\sim(R \wedge S) \leftrightarrow (R \vee S)$
Find Disjunctive Normal Form (DNF) of $(P \rightarrow Q) \wedge (Q \rightarrow R)$ CO2 **5**

C) Determine the relation and properties of relation given by the graphs shown below. Justify your answer; also write the corresponding relation matrix. CO3 **4**



D) Define following with example. CO1 **3**

1. Equivalence relation
2. Join semi lattice
3. Intersection of set

Q2 A) List out the elements in the following Partial Order Relation (POR) and draw the Hasse diagram of each — CO2 — 4

- $[\{\Phi,\{1\},\{2\},\{1,2\},\{1,2,3\},\{3,4\}\{1,3\},\subseteq]$
- $[\{1,2,3,4,6,12\},/]$

CO2

B) Prove if the following is group or not: — 4

1. $\{R \mid R \text{ is set of real numbers}\}, +$
2. $\{0, \pm k, \pm 4k, \pm 8k, \pm 12k, \ldots\ldots \infty\}, +, k \text{ is natural number}$

CO2

C) Solve the following and give proper justification

1. Condition for monoid is _____

a) (a+e)=a
b) (a*e)=(a+e)
c) a=(a*(a+e))
d) (a*e)=(e*a)=a
e) None of the above

2. If A and B are disjoint nonempty set then A-(A-B) is equal to

a) B b) A c) null d)A union B e) None of the above — 5

3. The relation "son of" is

a) Reflexive b) Symmetric c) Transitive d) Equivalence

4. Which of the following statement is a proposition?

a) Get me a glass of milkshake
b) God bless you!
c) What is the time now?
d) The only odd prime number is 2

5 .....is the negation of the statement $A \rightarrow (B \vee C)$.

End of question paper