



Semester : III

Subject : DSGT

Academic Year: 2022-2023

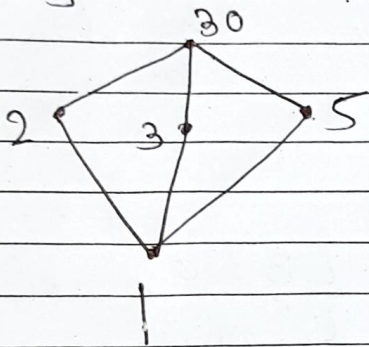
* (4) Distributive Lattice -

A lattice 'p' is said to be distributive if for all $a, b, c \in p$,

i) $a \wedge (b \vee c) = (a \wedge b) \vee (a \wedge c)$

ii) $a \vee (b \wedge c) = (a \vee b) \wedge (a \vee c)$ holds.

e.g.



① for 2, 3 and 5

$a = 2, b = 3 \text{ and } c = 5$

i) $2 \wedge (3 \vee 5) = (2 \wedge 3) \vee (2 \wedge 5)$
 $2 \wedge 30 = 1 \vee 1$
 $2 \neq 1$

ii) $2 \vee (3 \wedge 5) = (2 \vee 3) \wedge (2 \vee 5)$
 $2 \vee 1 = 30 \wedge 30$
 $1 \neq 30$

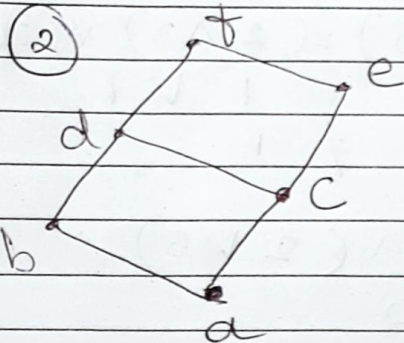
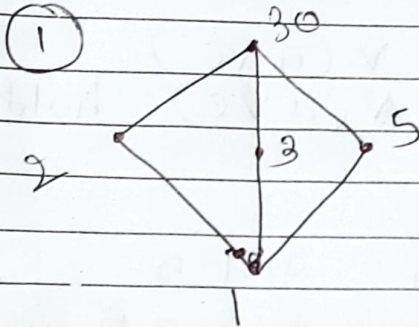
② for 1, 2, 3 \Rightarrow i) $1 \wedge (2 \vee 3) = (1 \wedge 2) \vee (1 \wedge 3)$
 \Rightarrow ii) $1 \vee (2 \wedge 3) = (1 \vee 2) \wedge (1 \vee 3)$

both conditions are true for 1, 2, 3
hence it is distributive lattice.

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Qx. A lattice P is said to be distributive if every element in P has "at most one complement".
at most = 0 or 1



$$UB = f \quad LB = a$$
$$f^c = a, \quad a^c = f$$

for $b \in c$

$$b \vee c = d, \quad b \wedge c = a$$

for $b \& e$