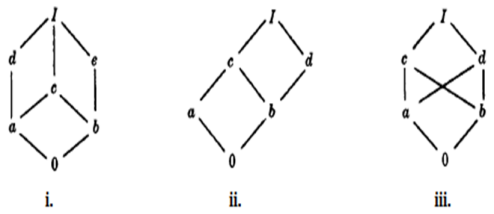
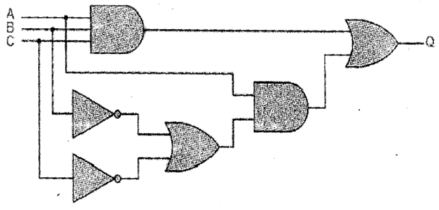
United College of Engineering and Research, Prayagraj
Department of Computer Science

B.Tech(2019-20)
Discrete Structures and Theory of Logic(KCS 303)
Assignment-3

QNo.	Question	CO Type	Bloom's level
1	Prove that a lattice with 5 elements is not a boolean algebra.	CO3	L3
2	Show that in a complemented, distributive lattice, a$\preceq$b $\Leftrightarrow$ a$\wedge$b' = 0 $\Leftrightarrow$ a'$\vee$b = 1 $\Leftrightarrow$ b'$\preceq$a'	CO3	L4
3	Let $(L, \vee, \wedge, \preceq)$ be a distributive lattice and a,b$\in$ L . if a $\wedge$ b = a $\wedge$ c and a $\vee$ b = a $\vee$ c then show that b = c.	CO3	L3
4	Describe the Boolean duality principle. Write the dual of each Boolean equations: 1. x + x'y = x+y 2. (x.1)(0+x')= 0	CO3	L3
5	Draw the Haase diagram of $< P(a,b,c), \preceq >$. Find greatest element, least element, minimal element and maximal element.	CO3	L3
6	Simplify the following Boolean function using three variables maps: 1. f(x,y,z)=$\sum(0,1,5,7)$ 2. f(x,y,z)=$\sum(1,2,3,6,7)$	CO3	L3
7	Answer these questions for the poset $< \{3,5,9,15,24,45\}, \mid >$. (i) Find the maximal elements. (ii) Find the minimal elements. (iii) Is there a greatest element? (iv)Is there a least element? (v)Find all upper bounds of {3, 5}. (vi)Find the least upper bound of {3, 5}. (vii)Find all lower bounds of {15, 45}. (viii) Find the greatest lower bound of {15, 45}, if it exists.	CO3	L4
8	Which of the partially ordered sets are lattices?  i. ii. iii.	CO3	L3
9	Distinguish betrveen bounded lattice and complemented lattice.	CO3	L2
10	Show that the "greater than or equal" relation ($\geq$) is a parttal ordering on the set of integers.	CO3	L2
11	In a Lattice if $a \preceq b \preceq c$, then show that (i) $a \vee b = b \wedge c$ (ii) $(a \vee b) \vee (b \wedge c) = (a \vee b) \wedge (a \vee c) =$ b	CO3	L3
12	Prove that every finite subset of a lattice has an LUB and a GLB.	CO3	L2
13	Give an example of a lattice which is a modular but not a distributive.	CO3	L2
14	Find the Boolean algebra expression for the following system. 	CO3	L4
15	Let L be a bounded distributed lattice, prove if a complement exists, then it is unique. Is D(12) a complemented lattice?	CO3	L4