(b) Draw the unique binary tree for the given in order and post order traversal

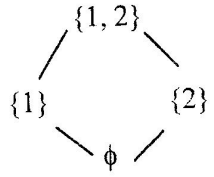
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In order | 4 | 6 | 10 | 12 | 8 | 2 | 1 | 5 | 7 | 11 | 13 | 9 | 3 |
| Post Order | 12 | 10 | 8 | 6 | 4 | 2 | 13 | 11 | 9 | 7 | 5 | 3 | 1 |

## UNIT – V

**9.** (a) Simplify the following Boolean expression $[a(a+b)+(b'+a)b]'$

(b) Define Bounded Lattices with example.

(c) Consider the Hasse diagram given below. Determine the value of set A and also determine the set R (Relation set).




(d) Using Euler's theorem, find the size of the complete bipartite graph $K_{m,n}$.

(e) Find the adjacency matrices of $K_{2,3}$.

(f) If $T_1=(V_1,E_1)$, $T_2=(V_2\ E_2)$ be two trees, where $|E_1|=17$ and $|V_2|=2|V_1|$. Determine $|V_1|$, $|V_2|$ and $|E_2|$.



*Roll No.* .....

# 21254

# B. Sc. (Math) (Hons.) 2nd Semester Examination – May, 2019

## DISCRETE MATHEMATICS - II

**Paper : BHM-124**

***Time : Three hours ]*** ***[ Maximum Marks : 60***

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

***Note :*** Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **9** is ***compulsory***.

## UNIT – I

**1.** (a) Let $(L,\leq)$ be a lattice. If a, b, c $\in$ L, then

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

(ii) $a\wedge(b\vee c)\leq(a\wedge b)\vee(a\wedge c)$

(b) Let a, b, c be the elements in a lattice $(L,\leq)$. Show that if $a\leq b$, then $a\vee(b\wedge c)\leq b\wedge(a\vee c)$.

**2.** (a) Let $(L,\leq)$ be a distributive lattice. Show that if $a\wedge x=a\wedge y$ and $a\vee x=a\vee y$ for some a, then $x=y$.

(b) Consider the set $A = \{k, l, m, n, p\}$ and the corresponding relation $R = \{(k, k), (l, l), (m, m) (n, n), (p, p), (k, m), (k, l), (k, n), (k, p), (m, n) (m, p), (n, p) (l, p)\}$. Construct the directed graph and the corresponding Hasse diagram of this partial order.

## UNIT – II

**3.** (a) Let $D_{35}$ be the set of +ve factors of 35. Two binary operations '+' and '.' are defined as follows $a + b$ = LCM $(a,b)$ and $a.b$ = gcd $(a, b)$ $\forall$ $a,b \in D_{35}$. A unary operation (') on $D_{35}$ is defined as $a' = \frac{35}{a} \forall a \in D_{35}$. Show that $(D_{35}, +, ;', ', 35)$ is a Bolean algebra.

(b) Write the dual of each of the following statements in $(B, +, \cdot, ')$

(i) $[(a'+b).(b'+c)].(a'c)' = 0$

(ii) $a.b' + b = a + b$

(iii) $a + [(b' + a).b]' = 1$

**4.** (a) Write the function $f(x, y, z) = (x + y), (x + y') (x' + z)$ be given boolean function, find its disfunctive normal form.

(b) Given the Boolean expression $f = ABC + B\bar{C}D + \bar{A}BC$.

(i) Make a truth Table

(ii) Simplify using K-map

(iii) Make the switching circuit of the expression.





## UNIT – III

**5.** (a) Show that there is no graph with 12 vertices and 28 edges in which the degree of each vertex is either 3 or 6.

(b) Show that $K_5$ is a non- planer graph.

**6.** (a) Write an algorithm for the shortest path problem

(b) A finite graph G has an Euler circuit if and only if it is connected and all vertices have even degree.

## UNIT – IV

**7.** (a) Define the following :

(i) M- ary tree

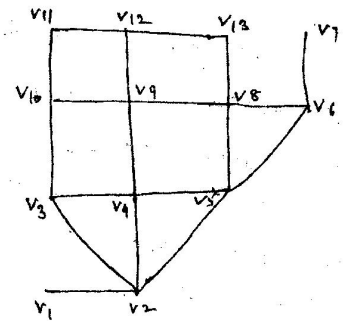
(ii) Full m- ary tree

(iii) Full Binary tree

(iv) Complete Binary tree

(b) Write a short note on Prim's Algorithm

**8.** (a) Use depth first search to find the spanning tree of the following connected graph G.






P. T. O.