Semester II (B.Tech.)

Number of printed pages 02

Er. No.[redacted]

Academic Year: 2021-22

Jaypee University of Engineering & Technology, Guna

T-3 (Even Semester 2022)

18B11MA211 – Discrete Mathematics

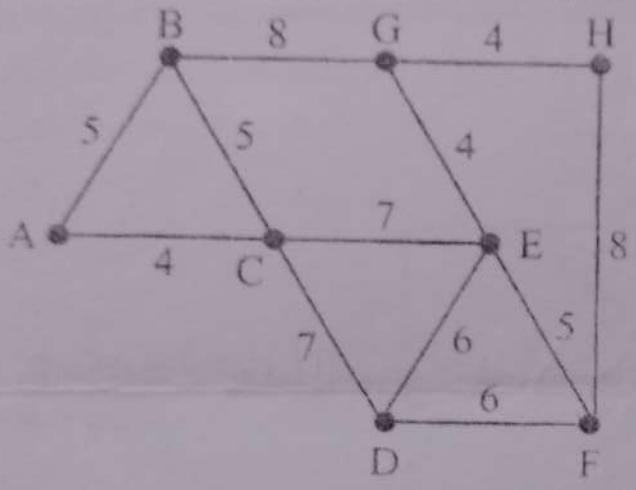
Maximum duration: 2 Hours | Maximum Marks: 35

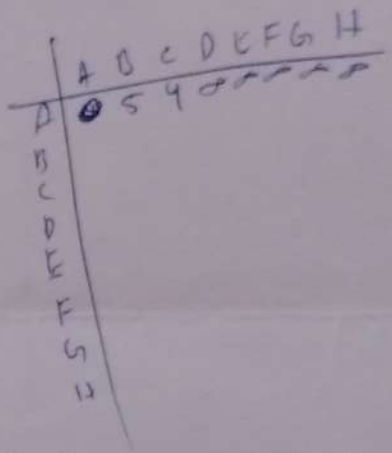
Notes:

1. This question paper has seven questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

Marks

Q1. Find the minimum weight and minimum spanning tree for the following weighted graph: [5]





Q2. The preorder and inorder search of a binary tree yield the following sequence of vertices [5]

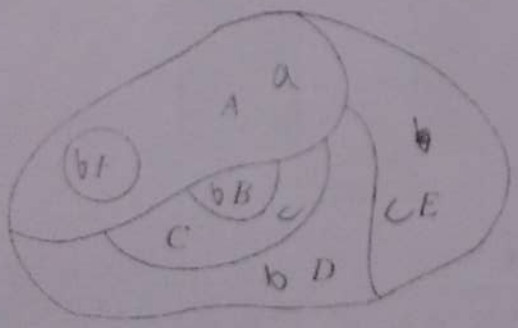
~~Preorder~~ Inorder: D B E H Q S E A C R K F L

~~Inorder~~ Preorder: A B D E H P Q S C F K R L

(a) Draw the binary tree T

(b) Find the height of tree T and the descendants of vertex T.

Q3. Construct the dual graph for the map given below and find its chromatic number: [5]



Preorder: A B D E G H C I F

~~Inorder~~ Inorder: D B G E H A I C F

Q4. Prove that the set S of numbers of the form $a+b\sqrt{2}$ where a and b are integers is a field with respect to ordinary addition and multiplication. [5]

Q5. Draw the ordered rooted tree and find the value of the arithmetic expression written in the following prefix notation: [5]

+ − ↑ 3 2 ↑ 2 3 / 6 − 4 2

Q6. Consider the set $D_{30} = \{1,2,3,5,6,10,15,30\}$ under the relation x divides y. [5]
(a) Draw the Hasse diagram.
(b) Is it a lattice?
(c) Is it distributive and complemented?
(d) Which elements are join irreducible and atoms?
(e) Find the complement of 2 and 10 if exists.

Q7. Draw the transition diagram of a finite state automata M that accepts those strings from $\sum = \{a,b\}$ which have even number of a's. [5]

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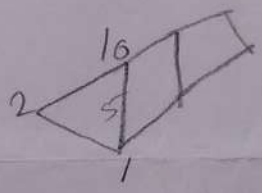

$2 \cap (3 \cup 6)$ $a \cap B = \phi$
$a \cup b = I$