[77] SEAT No._____ **No. of Printed Pages : 2**

SARDAR PATEL UNIVERSITY
M.Sc.(Information Technology)
Semester-I External Examination
PS01CINT21- Introduction to Theoretical Computer Science
Tuesday, 23rd October ,2018

Time:10:00 am to 1.00 pm **Marks:70**

Q1 **Give answers of following Multiple choice questions** [8]

1 Following graph does not have edges
A Euler graph B Sub graph
C Hamiltonian graph D Null graph

2 A problem is considered as ___, if it can be solved by efficient algorithm.
A Tractable B Intractable
C Solvable D None

3 A decline or changes that have occurred in Mango sales during March to June is called ____ variation.
A Trend B Seasonal
C Cyclic D Irregular

4 a v a=a is _____
A Commutative property B Absorption property
C Idempotent property D Associative property

5 _____ is a set of statistical observations arranged in chronological order.
A Statistical series B Time series
C Observations D None of these

6 Set of real numbers between " 0 and 1"
A Countable finite B finite
C Uncountable Infinite D None of these

7 Replacing meet operation over join and join over meet operation is known as ____
A Principal of membership B Principle of lattices
C Principle of duality D None of these

8 Total number of edges in complete graph K4 is ____.
A 4 B 6
C 8 D 12

Q2 **Do as directed (Any 7)** [14]

1 With the help of truth table prove that X V (Y V Z)=(X V Y) V Z.
2 Write a short note on Universal Set and Cardinality of a set.
3 Explain Adjacent and Parallel edges with example.
4 Define Equivalence relation. If A = {1,2,3} and is defined as R = {(x,y)/x≤y} Check whether the given relation is equivalence relation or not.
5 Define intractable and tractable problem with example.
6 Construct a Circuit diagram for:
(1) YZ+X (YZ'+Y'Z) (2) X.Y+X'.Y'
7 List and explain the utilities of time series.
8 What is difference between Walks and Paths in graph?
9 Write down the equation for straight line and parabolic form.

Q3 [A] What is POSETS? Explain properties of POSETS. Draw the Hasse diagram of of<P(A), ⊆> for [6]

(1)A={a,b,c} (2)A={a,b,c,d}

Q3 [B] Define a binary relation. Briefly Explain Reflexive, Symmetric, and Transitive Relations using with proper example. [6]

OR

Q3 [B] Discuss Lattices? Explain Meet and Join operation. [6]

Q4 [A] Explain the following with example: [6]

1. Multi-graph 2. Complete Graph 3. Weighted Graph.

Q4 [B] Explain with example Hamiltonian path and Hamiltonian Circuit. [6]

OR

Q4 [B] Determine trend of the following data using semi-average method and estimate the value for year 2020. [6]

Year	2013	2014	2015	2016	2017	2018
Profit	20	24	22	30	28	32

Q5 [A] Define Time Series. List and explain the components of time series. [6]

Q5 [B] Define Algorithm to find largest number among given n numbers with its time complexity. [6]

OR

Q5 [B] Explain Dijkshtra (Shortest Path) Algorithm in detail. [6]

Q6 [A] Below is given the Census population of INDIA(2014-2018) [6]

T	2014	2015	2016	2017	2018
Y	8	9	8	9	16

T:Year; Y:Population ('in millions')

Fit a Straight line and determine the population for the year 2021

Q6 [B] From the following data, calculate 5-yearly moving averages. [6]

Year (19'-20')	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09
Cyclical Fluctuations	+2	+1	0	-2	-1	+2	+1	0	-2	-1	+2	+1	0	-2	-1

OR

Q6 [B] Explain complexity of problems using with proper example. [6]

—X—

(2)