Seat No.: ________

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[39]

SARDAR PATEL UNIVERSITY
M. Sc. Information Technology
Semester – I External Examinations
PS01CINT03 – Introduction to Theoretical Computer Science
Monday, 24th October, 2016

Time: 10:00 a.m. to 01:00 p.m. Max Marks: 70

Q-1 Give answers of following Multiple choice questions [8]

1. A directed loop has ________.
   (A) 1 in-degree & 1 out degree (B) 2 in-degree & 1 out degree
   (C) 0 in-degree & 1 out degree (D) 1 in-degree & 0 out degree
2. If two graphs G and G' is having one to one correspondence between their edges and vertices sets such that incidences of edges on vertices are preserved then such graphs are called as ________________ to one another.
   (A) Sub graph (B) Isomorphic graph
   (C) Derotated graph (D) None of these
3. R be a relation defined on a set A, then R is ________ if a R a holds all a belongs to A i.e (a,a).
   (A) Reflexive Relation (B) Symmetric Relation
   (C) Asymmetric Relation (D) Relative Relation
4. Equivalence relation is_______.
   (A) Reflexive, Symmetric, Transitive (B) Irreflexive, Symmetric, Transitive
   (C) Reflexive, Symmetric, Atransitive (D) None of these
5. Increase in price of water bottle during world war is known as ________ variation.
   (A) Cyclic (B) Secular
   (C) Irregular (D) Regular
6. _____ is operation of Switching Circuit.
   (A) Parallel (B) Serialize
   (C) Both (a) and (b) (D) None Of these
7. For every a and b in lattice A, $a \vee (a \wedge b) = a$ and $a \wedge (a \vee b) = a$ is known as the ________________ property of the join and meet operations.
   (A) Associative (B) Commutative
   (C) Distributive (D) Idempotent
8. In a _________ class of problems, if any one problem can be proved as intractable then all the other problems are intractable.
   (A) NP (B) NN
   (C) PN (D) PP

Q-2 Answer the following questions (Any Seven): [14]

1. Give definition of Crisp Logic.
2. What is Planner Graph and Multi Graph?

3. Define Irreflexive relation And Reflexive Relation with example.
4. Explain Associative Operation of Fuzzy Logic with example.
5. With the help of truth table prove that $a \vee (b \vee c) = (a \vee b) \vee c$.
6. What is time series?
7. State the principle of duality.
8. Write Largest1 algorithm for finding maximum number.
9. Define Tractable and Intractable Problem.

Q-3

[A] If f(x)=5x+3 and g(x)=10x-5 then find fog(x), gof(x). **[6]**

[B] Write De' Morgan's law and prove it using set operation. **[6]**

OR

[B] Explain Euler's graph and circuit in detail along with example. **[6]**

Q-4

[A] Write a note on complexity of problems. Explain by taking suitable example. **[6]**

[B] Define lattice, distributive lattice and complemented lattice. Also discuss universal upper bound and universal lower bound. **[6]**

OR

[B] Explain the use of lattices in development of digital circuits. Also draw the circuit diagram for $xyz + \overline{xyz} + x\bar{y}z$. **[6]**

Q-5

[A] Discuss long term variation, cyclic variation, seasonal variation and irregular variation in time series. **[6]**

[B] Determine the trend values for the following data using the least square method. And also predict the production value for the year 2013. **[6]**

Year	2006	2008	2010	2012	2014
Production(in thousands)	15	18	20	24	13

OR

[B] Determine trend of the following data using Semi – Average method and estimate the production value for 2015. **[6]**

Year	2008	2009	2010	2011	2012	2013
Production(in thousands)	15	19	17	25	26	27

Q-6

[A] Explain Fuzzy Logic and Fuzzy Set. What are the applications of fuzzy logic? **[6]**

[B] If $\tilde{P}$ and $\tilde{Q}$ are fuzzy preposition and their truth value T($\tilde{P}$) = 0.65 and T($\tilde{Q}$) = 0.9 then find (1) ~ T($\tilde{P}$) (2) T($\tilde{P}\ V\ \tilde{Q}$) (3) T($\tilde{P} \Rightarrow \tilde{Q}$) **[6]**

OR

[B] Let fuzzy set A= {(x1,0.5)(x2,0.3)(x3,0)} and B={(x1,0.3)(x2,0.4)(x3,1)} be a two fuzzy sets defined on universe of disclosure X. Perform the following operations (1) Find A U B (2) A $\cap$ B (3) find A'. **[6]**