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SEAT No. _____

No. of Printed Pages : 2

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Sardar Patel University
Master of Computer Application
SEMESTER – I Examination (ATKT)
PS01FMCA01: Mathematical Foundation of Computer Science
Friday, 5th April, 2019

Time: 10:00 AM to 01:00 PM

Max Marks: 70

Q.1 Select the most appropriate answer for the following questions:

[8]

- i. The rank of $A = \begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix}$ is _____.
- A) 0
B) 1
C) 2
D) 4
- ii. The contradiction of atomic variable P is _____.
- A) $\neg(\neg P)$
B) $\neg P$
C) -1
D) none of these
- iii. If logical operator OR is used then True OR False will return _____.
- A) False
B) True
C) -1
D) 0
- iv. If rows and columns of matrix are interchanged, then the operation is called as _____.
- A) transpose
B) inverse
C) determination
D) None of these
- v. A graph has no self loops and parallel edges, is called ____.
- A) Simple
B) Linear
C) Non Linear
D) Complex
- vi. A graph in which there is only one path between every pair of vertices is called ____ graph.
- A) Connected
B) Regular
C) Tree
D) Complete
- vii. A graph with all vertices of degree 0, is called ____ graph.
- A) Null
B) Not
C) Di
D) Complete
- viii. A graph is separable if it's _____.
- A) Vertex connectivity is 1
B) Edge connectivity is 1
C) Vertex separability is 1
D) Edge separability is 1

Q.2 Answer the following questions (Any seven):

[14]

- i. Verify using truth table whether $P \vee \neg P = P$
- ii. For atomic variables P, Q, R, write all minterms.
- iii. Define identity matrix and give one example of 3X3 identity matrix.
- iv. Find the determinant of the matrix $A = \begin{vmatrix} 2 & -2 \\ 3 & 3 \end{vmatrix}$.
- v. Define the term "Tree".
- vi. What is complete graph?
- vii. Explain intersection operation of two graphs by giving suitable example.

- viii. What is sub graph?
ix. What do you mean by vertex disjoint sub-graphs?

Q.3 Answer the following questions:

A Solve the following system of linear equation using method of your choice: [6]

$$x + y + 3z = 4, \quad -x - 2y + 4z = 3, \quad 3x - 4y - 2z = 1.$$

B Solve the following system of linear equation using gauss Jordan method. [6]

$$10x + y + z = 12, \quad x + 10y + z = 12, \quad x + y + 10z = 12.$$

OR

B Write and prove de-morgans law for statement P and Q using truth table. [6]

Q.4 Answer the following questions:

A State the principle of mathematical induction and check $1 + 3 + 5 + \dots + (2n - 1) = n^2$ [6]
is true or not.

B Find adjoint and determinant of matrix : $A = \begin{bmatrix} 7 & 2 & 1 \\ 0 & 3 & -1 \\ -3 & 4 & -2 \end{bmatrix}$ if it exists. [6]

OR

B Find inverse of matrix : $A = \begin{bmatrix} 3 & 0 & 2 \\ 2 & 0 & -2 \\ 0 & 1 & 1 \end{bmatrix}$ if it exists. [6]

Q.5 Answer the following questions:

A What is graph? Explain various components of graph by giving example. [6]

B Write a note on Utilities Problem and its solution through graph theory. [6]

OR

B Write a note on Euler graphs. [6]

Q.6 Answer the following questions:

A Write steps of Prim's algorithm to find shortest spanning tree in a given connected graph. Explain the same with suitable example. [6]

B Write a note on incidence metrics. [6]

OR

B Write a note on adjacency metrics. [6]

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