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[4966]-2003

M.C.A. (Commerce Faculty) (Second Semester) EXAMINATION, 2016

203 : ELEMENTS OF MATHEMATICS

(CREDIT SYSTEM)

(2013 PATTERN)

Time : Three Hours

Maximum Marks : 50

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

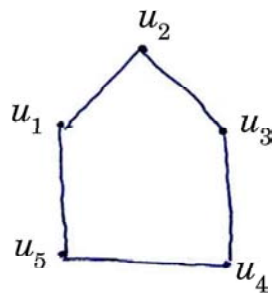
1. Attempt any *two* from the following : [2×7=14]

(a) Use Gaussian elimination to solve the system of linear equations :

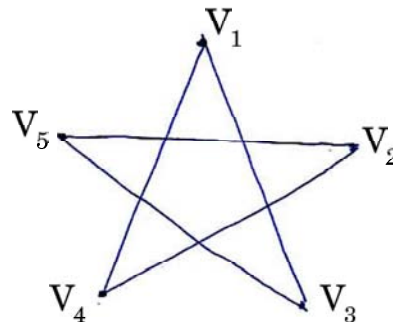
$$\begin{aligned}2x_2 + x_3 &= -8 \\x_1 - 2x_2 - 3x_3 &= 0 \\-x_1 + x_2 + 2x_3 &= 3\end{aligned}$$

(b) Let $A = \{1, 2, 3, 4, 5, 6\}$ be a set and relation R defined on A as : xRy if and only if $a \leq b$. Determine whether R is a partial order relation or not.

(c) Verify that the following graphs are isomorphic or not :



Graph 'G'



Graph 'H'

P.T.O.

2. Attempt any *three* from the following : [3×4=12]

(a) Explain the equivalence classes with suitable example.

(b) Verify :

$$p \rightarrow [(q \vee r) \wedge \sim (p \leftrightarrow \sim r)]$$

is tautology or not.

(c) Explain the following terms with suitable example :

(i) Directed graph

(ii) Multigraph.

(d) Find the value of x :

$$\begin{vmatrix} 4 & -3 & 2 \\ 1 & x & 1 \\ 3 & 1 & -2 \end{vmatrix} = -45$$

3. Attempt any *three* from the following : [3×4=12]

(a) Explain various logical connectivities with truth table.

(b) Explain Minimum Spanning Tree (MST) with an example.

(c) Find the adjoint of :

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$$

(d) Let $F(x) = 2x - 1$ and $g(x) = 3x + 3$ then, find $F \circ g$ and $g \circ F$.

4. Attempt any *three* from the following : [3×4=12]

(a) Define the following terms with example :

(i) Disjoint set

(ii) Subset

- (b) Explain the following terms with suitable example :
- (i) Euler path
 - (ii) Euler circuit.
- (c) Examine the validity of the following argument using truth table :

$$\frac{p \wedge q}{\therefore q}$$

- (d) Using Warshall's algorithm find transitive closure of R. Let A = {1, 2, 3, 4} and R = {(1, 1), (1, 4), (2, 1), (2, 2), (3, 3), (4,4)}