DOON UNIVERSITY, DEHRADUN
Mid Semester Examination, First Semester, 2014
School of Technology

MCA

Course: STM-502: Mathematics-I

Time Allowed: 2Hours *Maximum Marks: 30*

Note: Attempt any 3 questions from each section. Marks distribution is given alongside.

SECTION: A

(Marks: 3*2=6)

1: Evaluate

$$\begin{vmatrix} 3 & 4 & -1 \\ 2 & 0 & 7 \\ 1 & -3 & -2 \end{vmatrix}$$

2: Find the value of given expression

If $A = \begin{pmatrix} -3 & 0 \\ 7 & -4 \end{pmatrix}$, $B = \begin{pmatrix} 2 & -1 \\ -7 & 4 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 0 \\ -2 & -4 \end{pmatrix}$ find $2A - 3B + 4C$.

3: Determine

$$\begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & 2 \\ 1 & 3 & 1 \end{pmatrix} \times \begin{pmatrix} 2 & 2 & 0 \\ 1 & 3 & 2 \\ 3 & 2 & 0 \end{pmatrix}$$

4: Find the Trace of the given Matrix

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

SECTION: B

Attempt any 3 questions. **(Marks:4*3=12)**

5: Determine the inverse of the matrix A where A=

$$\begin{pmatrix} 3 & 4 & -1 \\ 2 & 0 & 7 \\ 1 & -3 & -2 \end{pmatrix}$$

6: Write down the transpose of the given matrix

$$\begin{pmatrix} 3 & 6 & \frac{1}{2} \\ 5 & -\frac{2}{3} & 7 \\ -1 & 0 & \frac{3}{5} \end{pmatrix}$$

7: Solve the system of simultaneous equations using Cramer rule

$3x + 4y + z = 10$

$2x - 3y + 5z + 9 = 0$

$x + 2y - z = 6$

8: Verify the Cayley-Hamiltonian theorem for the given matrix and also find its inverse using this theorem.

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

SECTION: C

Attempt any 3 questions. **(Marks: 4*3=12)**

9: Show that Matrix Multiplication is not Commutative i.e., A*B Not Equal to B*A using any Matrix A and B.

10: Show that the vectors [0,1,-2],[1,-1,1],[1,2,1] form a linearly independent set.

11: Find the characteristics equation and Eigen Values of the given matrix A

$$\begin{bmatrix} 1 & 2 & 2 \\ 0 & 2 & 1 \\ -1 & 2 & 2 \end{bmatrix}$$

12: Find the rank of the following matrix using triangular form.

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$$