SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with A+ Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc. END SEMESTER EXAMINATIONS NOVEMBER – 2022
SEMESTER – II

20USTCT2004 – Matrix Algebra

Total Duration: 2 Hrs 30 Mins. Total Marks: 60

Section A

Answer any ***SIX*** questions (6 × 5 =30 Marks)

1. Explain the different types of matrices with an example.
2. Write down some matrices which are Symmetric but not Hermitian.
3. Show that $|A'| = |A|$.
4. Solve the system of equations:
   $x + 3y - 2z = 0$
   $2x - y + 4z = 0$
   $x - 11y + 14z = 0$
5. Show that the equations :
   $x + 2y - z = 3$
   $3x - y + 2z = 1$
   $2x - 2y + 3z = 2$
   $x - y + z = -1$ are consistent and solve the same.
6. Explain the properties of congruence of matrices.
7. Show that a positive definite real symmetric matrix is non-singular.
8. If ***A*** and ***B*** are two square matrices then show that the matrices ***AB*** and ***BA*** have the same Characteristic roots.

Section B

Part A

Answer any ***THREE*** questions (3 × 10 =30 Marks)

9. Show that $\begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$ is nil potent matrix of order 3.

Contd...

10. Reduce the matrix ***A*** to its normal form were

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$ Hence find the rank of ***A***

11. Solve the following equations with the help of matrices:

x + 2y +3z = 14

$$3x + y + 2z = 11$$

$$2x + 3y + z = 11$$

12. State and prove Cayley-Hamilton theorem.
13. Convert to quadratic form

$6{x_1}^2 + 3{x_2}^2 + 14{x_3}^2 + 4_{x2x3} + 18_{x3x1} + 4_{x1x2}$

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