B.Sc. DEGREE EXAMINATION, APRIL 2018.

I YEAR II SEMESTER

Core Major - Paper IV - MATRIX ALGEBRA

Time : 3 Hours Max. Marks : 60

SECTION A – (10 × 1 = 10 marks)

(Q. No. 1-12)Answer any *TEN* questions

1. Define Transpose of a matrix
2. Define skew symmetric matrix
3. Define Inverse of a matrix
4. What do you mean by rank of a matrix?
5. When does the system of linear equations have a unique solution
6. What is the difference between trivial and non-trivial solution
7. Define characteristic equation
8. State Cayley-Hamilton theorem
9. What do you mean by quadratic form?
10. State the fundamental theorem on quadratic form.
11. What is the signature of the matrix?
12. Define trace of a matrix

SECTION B – (5 × 4 = 20 marks)

(Q. No. 13-19)Answer any *FIVE* questions

1. Find AxB if A =$\left[\begin{matrix}2&3&4\\-1&2&-5\end{matrix}\right]$ B = $\left[\begin{matrix}1&2\\3&-4\\-5&6\end{matrix}\right]$
2. State the properties of matrix addition
3. If A and B are the square matrices of same order then prove that

$$\left(AB\right)^{-1}= B^{-1}A^{-1}$$

1. Find the Rank of a matrix$\left(\begin{matrix}1&2\\2&4\\-1&-1\end{matrix}\begin{matrix}-1&3\\-4&7\\-1&2\end{matrix}\right)$
2. Find the values of a and b such that the simultaneous equations

X+Y+2Z = 2; 2x – Y +3Z =2; 5X-Y +aZ = b have (i) unique solution and (ii) no solution

1. Find the characteristic equation and eigen values of the matrix $\left(\begin{matrix}8&-6&2\\-6&7&-4\\2&-4&3\end{matrix}\right)$
2. Discuss the nature of quadratic form 10x2 +2y2+5z2 +6yz -10xz – 4 xy

P.T.O.

SECTION C – (3 × 10 = 30 marks)

(Q. No. 20-24)Answer any *THREE* questions

1. a) Show that any real square matrix can be expressed as a sum of symmetric and skew symmetric matrix

 b) Represent $\left(\begin{matrix}2&1&4\\8&-1&3\\3&-5&0\end{matrix}\right)$ as a sum of symmetric and skew symmetric matrix

1. If A = $\left(\begin{matrix}3&-3&4\\2&-3&4\\0&-1&1\end{matrix}\right)$ then show that A3 = A-1.
2. Solve the following equations by cramer’s rule

X+Y+Z = 6; 2X+3Y-5Z = 7 ; X-3Y+ 2Z =-1

1. Verify cayley Hamilton theorem for the matrix$\left(\begin{matrix}2&-2&3\\1&1&1\\1&3&-1\end{matrix}\right)$
2. Write down the quadratic form, whose associated matrix is $\left(\begin{matrix}3&1&1\\1&0&2\\1&2&0\end{matrix}\right)$ and reduce it to

 its Canonical form.