PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

IA&VOS.

BSc DEGREE EXAMINATION MAY 2017
(First Semester)

Branch- STATISTICS

MATRICES

Time: Three Hours Maximum: 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks (10x2 = 20)

Give the examples for diagonal matrix and scalar matrix.

What is meant by unitary matrix?

Define determinant of a square matrix.

4 Find the cofactor of $\begin{matrix} '3 & 2 \\ 5 & 0 \end{matrix}$

Find the rank of A = $\begin{matrix} 3 & 6 \\ 4 & 8 \end{matrix}$

6 • What is the application of rank of a matrix?

7 Define characteristic polynomial.

8 What is characteristic vector?

9 Define basic of a vector.

10 Define quadratic form.

SECTION - B *(2 5* Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a Show that the matrix $\begin{matrix} \text{coso} & \text{sino} \\ \text{-sinO} & \text{coso} \end{matrix}$ is orthogonal.

OR

Define (i) Hermitian matrix with example (ii) Skew - Hermitian matrix with example. »

12 a Find the adjoint of $\begin{matrix} 1 & 2 \\ 5 & 3 \\ 2 & 1 \end{matrix}$

OR

b State the properties of determinant.

13 a Verify whether the given system of equation is consistent.

2x + 5y + 7z = 52
x + y + z = 9
2x + y-z = o.

• OR

b Explain homogenous and non-homogenous with examples.

14 a Derive the expression for the inverse of a non-singular matrix.

OR

b State certain relationship between characteristic roots and vectors.

15 a Write down the quadratic forms corresponding to the following symmetric matrices. .

$$\begin{matrix} 1 & 2 & 3 \\ 2 & 0 & 3 \\ 3 & 3 & 1 \end{matrix}$$

(ii) dig $(X_h\ X_2, \text{-----} K)$ -

OR

b Write down the matrix of each of the following quadratic forms,

(i) xf-18x2X2 +5x2 (ii) x^+2x2-5x3 ~x_1x_2-3x_3X!.

SECTION - *C* (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

16 i) Define equal and equivalent matrices.

ii) Show that the matrix A = $\begin{bmatrix} -5 & -8 & 0 \\ 3 & 5 & 0 \\ 1 & 2 & -2 \end{bmatrix}$ is involutoiy.

17 Find the inverse of the matrix A = $\begin{matrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{matrix}$

18 • Find the rank of the matrix $\begin{vmatrix} 1 & 2 & 3 & -1 \\ 2 & 4 & 6 & -2 \\ 3' & 6 & 9 & -3 \end{vmatrix}$

19 Determine the characteristic roots of a matrix A = $\begin{matrix} 0 & 1 & 2 \\ 1 & 0 & -1 \\ 2 & -1 & 0 \end{matrix}$

20 Define:

(i) Positive definite
(ii) Negative definite
(iii) Positive semi-defmite
(iv) Negative semi-definite
(v) Indefinite.

Z-Z-Z END