PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2017
(First Semester)

Branch - **STATISTICS**

MATRICES

Fime : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks   (1 0 x 2 = 20)'

1   Define conjugate of a matrix.

2   Define skew - symmetric matrix.

3   Define adjoint of a square matrix.

4   Define co-factors.

5   Define rank of a matrix.

6   Define homogenous equations.

7   What is matrix polynomial?

8   Define characteristic roots of a matrix.

9   Define vector space.

10   What is quadratic form? Give one example.

SECTION - B (25 Marks)
Answer **ALL** Questions
ALL Questions Carr}' **EQUAL** Marks (5 x 5 = 25)

11 a Prove that the necessary and sufficient condition for the matrix to be skew
        - symmetric (i.e) A^1 = -A.
                              OR
    b If A is an m x n matrix, the show that - (-A) = A.

12 a Explain determinant of a square matrix.
                              OR
    b Find the adjoint of the matrix A -   ^r] 2   Also verify that

        A(adj A) = (adj A) A = ;Aj 1.

13 a Explain the working rule for finding the solution of the equation A X - B .
                              OR
    b Determine the rank of matrix.
            1   2   - 1 4
        A =   2   4   3
            -1   - 2 6

                                                                  Cont...

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

OR

b   Prove that, if A and B be n x n matrices and B be non-singular than A and B' AB have the same minimal polynomial.

15 a Explain the concept of subspace basis and dimension.

OR

b Write down the matrix of the quadratic forms and verify that they can be written as matrix products x' Ax. x_j -18x1x2 + 5x2-

SECTION - C (30 Marks)
Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks ($3 \times 10 = 30$)

16   If A $\begin{bmatrix} 1 & 2 \end{bmatrix}$ find A A' and A'A.

17   Solve the system of linear equations with the help of Cramer's rule,
$x + 2y + 3z. = 6$
$2x + 4y + z = 7$
$2x + 2y + 9z = 14.$

18   Show that the equations
$x + y + z = 6$
$x + 2y + 3z = 14.$
$x - 4y + 7z = 30$
are consistent and solve them.

19   State and prove Cayley - Hamilton theorem.

20   Prove that the quadratic form.
$6x^2 + 49y^2 + 5 lz^2 - 82 yz + 20 zx - 4xy$
in three variables is positive definite.

Z-Z-Z   END