

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
BSc DEGREE EXAMINATION DECEMBER 2022  
(Fifth Semester)

Branch – STATISTICS

STATISTICAL QUALITY CONTROL - I

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 x 2 = 20)

1. Define Product control.
2. Define Process Capability.
3. What is producer risk?
4. Define Single Sampling Plan.
5. Write any two assumptions of acceptance sampling for variables.
6. What is meant by assumptions of acceptance sampling for variables?
7. Define Tightened Plans.
8. Define Sequential Sampling Plan.
9. What is just in time manufacturing?
10. Define Six sigma.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11. a) Explain the need for Quality Control.  
(Or)  
b) Describe the specification of items under lot quality in visual gauging.
12. a) Explain the acceptance sampling for attributes.  
(Or)  
b) Describe the Single Sampling Plan for OC and AOQ.
13. a) State the advantages and disadvantages for acceptance Sampling for variables.  
(Or)  
b) Explain the general procedure of acceptance sampling for variables.
14. a) Derive the Sequential sampling plan for OC.  
(Or)  
b) Describe the design of item by item in sequential sampling plan.
15. a) Explain the elements of JIT methods.  
(Or)  
b) Discuss about the Kanban System.

SECTION - C (30 Marks)

Answer any THREE Questions

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

16. Explain the importance of statistical methods in industrial research, practice and its benefits.
17. Derive the Single Sampling Plan for OC, AOQ, ASN and ATI.
18. Derive the n and k for known  $\sigma$  and unknown  $\sigma$  plans.
19. Derive the Sequential sampling plan for ASN and ATI.
20. Explain the objectives and benefits of JIT.

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
BSc DEGREE EXAMINATION DECEMBER 2022  
(First Semester)

Branch – STATISTICS

MATRICES

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 x 2 = 20)

1. Define Hermitian Matrix.
2. Differentiate scalar matrix and unit matrix.
3. What is a minor in matrix?
4. Give an example of Singular and Non-singular matrix.
5. Define Rank of matrix.
6. State the operation of elementary transformation.
7. Define Eigen vectors.
8. Find the eigen values of the matrix  $A = \begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$ .
9. Define Dimension of vector space.
10. Write down the matrix of the quadratic form  $2x^2 + 8z^2 + 4xy + 10xz - 2yz$

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11. (a) If  $A = \begin{bmatrix} 1 + 2i & 2 - 3i & 3 - 4i \\ 4 + 7i & 2 + 6i & 7 - 2i \\ 5 & -5i & 3i \end{bmatrix}$  find the conjugate transpose of A.

(OR)

(b) If A is Hermitian matrix prove that  $iA$  is skew-Hermitian.

12. (a) State the properties of determinants.

(OR)

(b) Find the determinant of a matrix  $A = \begin{bmatrix} 1 & 2 & 7 \\ 5 & 0 & 2 \\ 3 & -4 & 6 \end{bmatrix}$ .

13. (a) Find the rank of Matrix  $A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{bmatrix}$ .

(OR)

(b) Show that the square of a determinant is equal to its reciprocal or adjoint determinant.

14. (a) Explain Linear independence and dependence .

(OR)

(b) Find the characteristic polynomial for a second order matrix  $A = [a_{ij}]$  and also the characteristic roots.

15. (a) Are the three vectors  $A_1 = \begin{bmatrix} 25 \\ 64 \\ 144 \end{bmatrix}$ ,  $A_2 = \begin{bmatrix} 5 \\ 8 \\ 12 \end{bmatrix}$ ,  $A_3 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$  Linearly independent.

(OR)

(b) Define Quadratic form and its nature.