Avinashilingam Institute for Home Science and Higher Education for Women
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD [now MoE]
Re-accredited with 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore-641 043, Tamil Nadu, India

Continuous Internal Assessment Test II – April 2025

II Semester

Class : I PG **Time : 2 Hours**

Branch : Mathematics **Max. Marks : 60**

23MMAC10 – Mathematical Statistics II

Course Outcomes:

CO1: Demonstrate the concepts of Sampling theory.

CO2: Use ANOVA in agriculture field.

CO3: Apply the concept of classification of design of experiments.

CO4: Understand the methods of quality improvement.

CO5: Construct control charts.

Part A **6 x 1 = 6**

Choose the Correct Answer

1. _____ involves a method of permitting each unit of experimental material to be employed for every treatment under test. CO3K2

   a. Replication b. Randomization

   c. cross classification d. experimentation with similar materials

2. The total number of possible latin squares of order mxm is CO3K2

   a. (m-1)!(m-2)! x Number of standard squares b. m!(m-1)! x Number of standard squares

   c. (m-2)!(m-3)! x Number of standard squares d. (m-3)!(m-4)!xNumber of standard squares

3. All costs incurred in an effort to 'make it right the first time' are ____ costs. CO4K2

   a. Prevention b. Appraisal c. Internal failure d. External failure

4. The cost of pre-shipment operation of the product to prevent early-life failures in the field is _____. CO4K1

   a. Process control b. Burn-in c. Rework d. Scrap

5. The control chart for fraction non-conforming is _____ chart. CO5K2

   a. np b. u c. c d. p

6. The parameters required for constructing control charts are _____. CO5K1

   a. UCL, CL, LCL b. S^2 c. $\bar{x}$ d. σ

Part B **3 x 6 = 18**

Answer ALL questions

7. a. Discuss advantages and disadvantages if Latin Square Design. CO3K3

(or)

7. b. Determine Estimation of Missing values in Latin Square Design. CO3K2

8. a. Describe dimensions of quality. CO4K3

(or)

8. b. Explain chance causes of variation and assignable causes of quality variation with examples. CO4K2

9. a. Describe the operating characteristic function. CO5K3

(or)

9. b. Discuss control charts for nonconformities. CO5K3

Part C **3 x 12 = 36**

Answer ALL questions

10. a. Describe about Factorial Experiments. CO3K3

(or)

10. b. An experiment was carried out to determine the effect of claying the ground on the field of barley grains; amount of clay used were as follows: CO3K4

A : No clay B : Clay at 100 per acre

C : Clay at 200 per acre C : Clay at 300 per acre

The yields were in plots of 8 meters by 8 meters and layout were:

Column → Row↓	I	II	III	IV	Row total (R_i)
I	D 29.1	B 18.9	C 29.4	A 5.7	83.1
II	C 16.4	A 10.2	D 21.2	B 19.1	66.9
III	A 5.4	D 38.8	B 24.0	C 37.0	105.2
IV	B 24.9	C 41.7	A 9.5	D 28.9	105.0
Column total (C_j)	75.8	109.6	84.1	90.7	360.2

(i) Perform the ANOVA and calculate the critical difference for the treatment mean yields.
(ii) Calculate the efficiency of the above Latin Square Design over R.B.D and C.R.D.

11. a. Write a brief note about quality costs. CO4K4

(or)

11. b. Write a short note on Statistical methods for Quality control and Improvement. CO4K3

12. a. Describe an interpretation of $\bar{x}$ and R charts. CO5K3

(or)

12. b. Explain construction and operation of $\bar{x}$ and s charts. CO5K4

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