



*K Sambal*

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**Avinashilingam Institute for Home Science and Higher**  
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A'  
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 I – February 2025**  
**Semester - II**

**Class : I PG**  
**Branch : Mathematics**

**Time : 2 Hours**  
**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. A group of elements on which the observations can be taken is called a CO1K1  
 a. sample survey                      b. census survey                      c. pilot survey                      d. sampling unit
2. Among these, which sampling is based on equal probability? CO1K2  
 a. simple random sampling                      b. systematic random sampling  
 c. probability sampling                      d. stratified random sampling
3. Which of the following best describes the purpose of using ANOVA in research? CO2K2  
 a. ANOVA is used to compare the means of two groups  
 b. ANOVA is used to compare the means of more than two groups  
 c. ANOVA is used to determine the correlation between two variables  
 d. ANOVA is used to determine the interaction effect between dependent variables
4. The sum of squares divided by its degrees of freedom is called CO2K1  
 a. Total S.S                      b. S.S.E                      c. S.S.T                      d. M.S.S
5. The measurement of the variable under study on different experimental units are termed as CO3K1  
 a. Experiment                      b. Treatments                      c. Yield                      d. Experimental Unit
6. If the treatments are applied at random to relatively homogeneous units within each block and replicated over all the blocks, the design is known as CO3K2  
 a. Completely Randomised Design                      b. Randomised Block Design  
 c. Latin Square Design                      d. Variance Ratio

**Part B**

**3 x 6 = 18**

**Answer ALL questions**

7. a. Write the difference between Population, sampling and census with suitable example. CO1K2  
 (or)
7. b. Explain the Simple Random Sampling Method. CO1K3
8. a. The following table shows the lives in hours of four batches of electric lamps:

**Batches**

1.	1600	1610	1650	1680	1700	1720	1800	
2.	1580	1640	1640	1700	1750			
3.	1460	1550	1600	1620	1640	1660	1740	1820
4.	1510	1520	1530	1570	1600	1680		

Perform an analysis of variance of these data and show that a significance test does not reject their homogeneity. CO2K3

(or)

8. b. Explain briefly about Two-way Classification. CO2K2

9. a. Describe the principles of an Experimental Design.

CO3K2

(or)

9. b. A set of data involving four “tropical feed stuffs A, B, C, D” tried on 20 chicks is given below. All the twenty chicks are treated alike in all respects except the feeding treatments and each feeding treatment is given to 5 chicks. Analyse the data. Weight gain of baby chicks fed on different feeding materials composed of tropical feed stuffs:

CO3K3

						Total $T_i$
A	55	49	42	21	52	219
B	61	112	30	89	63	355
C	42	97	81	95	92	407
D	169	137	169	85	154	714
Grand Total						G = 1695

**Part C**

**3 x 12 = 36**

**Answer ALL questions**

10. a. Explain the principle steps involved in conducting a large scale sample survey.

CO1K4

(or)

10. b. Explain the Stratified Random Sampling Method.

CO1K3

11. a. Write down the procedure for Expectation of Error Sum of Squares with ANOVA table for one-way classified data.

CO2K4

(or)

11. b. The following table gives quality rating of service stations by five professional raters:

	<b>SERVICE STATION</b>									
<b>RATER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>A</b>	99	70	90	99	65	85	75	70	85	92
<b>B</b>	96	65	80	95	70	88	70	51	84	91
<b>C</b>	95	60	48	87	48	75	71	93	80	93
<b>D</b>	98	65	70	95	67	82	73	94	86	80
<b>E</b>	97	65	62	99	60	80	76	92	90	89

Analyse the data and discuss whether there is any significant difference between ratings or between service stations.

CO2K3

12. a. Explain briefly about C.R.D and R.B.D.

CO3K3

(or)

12. b. In the table given below are the yields of 6 varieties in a 4 replicate experiment for which one value is missing. Estimate the missing value and analyse the data.

CO3K4

		<b>Treatments</b>						
		1	2	3	4	5	6	Block Totals
<b>Blocks</b>	1	18.5	15.7	16.2	14.1	13.0	13.6	91.1
	2	11.7	-	12.9	14.4	16.9	12.5	68.4
	3	15.4	16.6	15.5	20.3	18.4	21.5	107.8
	4	16.5	18.6	12.7	15.7	16.5	18.0	98.0
Treatment Total $T_i$		62.1	50.9	57.3	64.5	64.8	65.7	365.3

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