Mid-West University

Examinations Management Office

End Semester Examinations 2081

Bachelor level/ B. Sc. /6th Semester — Full Marks: 60

Time: 3 hours — Pass Marks: 30

Subject: Design of experiment (STAT461)

Candidates are required to give their answer in their own words as far as Practicable. The figures in the margin indicate full marks.

Group –A

Long answer questions (Attempt all) **[4x6 = 24]**

1. What is ANOVA? In one way ANOVA with model $x_{ij} = \mu + \alpha_i + e_{ij}$; i= 1, 2,...k and j= 1, 2, ...n_i, by using this information show that :

$$\sum_{i=1}^{k}\sum_{j=1}^{n_i}(x_{ij} - \bar{x}_{..})^2 = \sum_{i=1}^{k} n_i(\bar{x}_{i.} - \bar{x}_{..})^2 + \sum_{i=1}^{k}\sum_{j=1}^{n_i}(x_{ij} - \bar{x}_{i.})^2$$ **[1+5]**

2. Describe RBD with layout, mathematical model and ANOVA table. Also write down its advantage and disadvantage. **[5+2]**
3. Derive the expression to measure the efficiency of LSD over CRD. **[6]**
4. What do you understand by factorial design? Describe 2^3 factorial design? **[1+5]**

OR

What is confounding. Also discuss on complete and partial confounding. **[1+5]**

Group - B

Short answer questions (*Attempt all*) **[6x4 = 24]**

5. Write down assumptions of ANOVA. Also discuss State Cochran`s theorem. **[2+2]**
6. Write down the layout of two-way ANOVA with one observation per cell, effect model and ANOVA table. **[1+1+2]**
7. What do you understand by CRD? Write down its advantage and disadvantage. **[2+2]**
8. Derive the expression for the missing observation in RBD. **[4]**
9. Describe the principles of design of experiment. **[4]**
10. Explain the process of computing main effect, interaction effect, SS_A, SS_B and SS_{AB} in 2^2 design. **[4]**

OR

Describe Graeco Latin Square design. **[4]**

Group - C

Very Short answer question (*Attempt all*) **[6x2 = 12]**

11. What are the applications of ANOVA.
12. Differentiate between one way and two ways ANOVA.
13. What do you understand by efficiency of design?
14. Discuss on concept of analysis of co-variance.
15. What are the advantages of factorial designs?
16. What is contrast and orthogonal contrast?

The End