

2015

STATISTICS

[Honours]

PAPER – VIIA

Full Marks : 50

Time : 2 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. Answer any two questions : 8 × 2
- (a) What are basic principles of design of experiments ? Describe how they are used in CRD, RBD and LSD.
- (b) Discuss the problem of selecting valid error in the context of two way layout with $m (\geq 2)$ observations per cell. Under fixed effect and random effect models.

(Turn Over)

- (c) Discuss a situation when a random effect model is appropriate for one way classified data. State the linear model and it's assumptions for above data. Also, obtain the expected values of mean squares.
- (d) Define main effects and interaction effects in 2^3 factorial experiments. Also give the ANOVA table for the experiment conducted in randomized blocks.

2. Answer any *four* questions : 5 × 4

- (a) Obtain the layout of a 2^3 -experiment in which four interaction effects are partially confounded.
- (b) Discuss the test procedure in ANOVA approach for testing the linearity of two variables.
- (c) Show that the efficiency of RBD compared to CRD is greater than 1 if mean square due to blocks is greater than mean square due to error.

- (d) Give the linear model for general 2^n experiment and also obtain the sum of squares due to main effect and interaction effects.
- (e) Show that in a 2^3 -factorial experiment with factors A , B and C , the effects AB and ABC are orthogonal. Are BC and AC also orthogonal?
- (f) Consider an RBD with one missing value. Obtain estimate for missing value under the restriction of null hypothesis.

3. Answer any *three* questions : 3 × 3

- (a) Describe the model and assumptions of analysis of covariance (ANCOVA) for an RBD with one concomitant variable.
- (b) Obtain critical difference for comparing means of two classes in one way classified data.
- (c) Define orthogonal contrasts. Explain how they are used in confounded factorial experiment.

- (d) Explain uniformity trial.
- (e) Derive the variance of the estimator of a main effect in a 2^3 -factorial experiment.

[*Internal Assessment* : 05 Marks]
