AU–431

M.A./M.Sc. (Part—II) Semester—III (CBCS) Examination

STATISTICS

Paper—XI

(Bioassay—I)

Time : Three Hours] [Maximum Marks : 80

Note :— Solve either (A) or (B) from each question.

1. (A) (a) State and prove Tillers theorem.

(b) Define the term 'Bioassay'. Discuss various components of bioassay. 10+6

OR

(B) (i) Define ratio estimator. Discuss the asymptotic property of the ratio estimator.

(ii) Explain the procedure of symmetric parallel line assay in detail. 6+10

2. (A) (a) Define median effective dose. Show that median effective dose is given by :

$ED_{50} = e^m$

$m = -\hat{a}/\hat{b}$ where $\hat{a}$ and $\hat{b}$ are the least square estimates.

(b) Explain the procedure of minimum logit χ^2 to estimate the parameter in dose relationship. 10+6

OR

(B) (i) Explain the procedure of estimating relative potency of a test preparation with that of standard preparation in Probits approach.

(ii) Give comparison between logit approach and Probit approach in quantal assay. 10+6

3. (A) (a) In Spearman-Karber method obtain the estimate of median effective dose 'M'. Also derive its variance.

(b) Explain the optimum sampling strategy in dose allocation problem. 10+6

OR

(B) (i) Explain the method for estimation of median effective dose by "Reed and Munch".

(ii) Explain Dose allocation scheme in detail. 10+6

4. (A) (a) Discuss various types of experimental data available to estimate "safe dose" in carcinogenic experiment. Write down the likelihood function.

(b) Describe up and down transformed response rule suggested by Wetherill. 10+6

OR

(B) (i) Define 'safe dose'. Write down the likelihood function and convex programming algorithm to estimate parameter α and β.

(ii) Explain stopping rule and give its importance. 10+6

5. (A) (a) Explain the concept of "ANOVA" in Bioassay in detail with example.

(b) Explain Bayes approach to the bioassay problem. 10+6

OR

(B) (i) Explain the concept of prior in Bayes approach of Bioassay. Give prior for ED_{50} to estimate it.

(ii) What is square error loss in Bayesian approach of Bioassay ? Explain in detail. 10+6