M.A./M.Sc. (Part—II) Semester—III (C.B.C.S.) Examination

STATISTICS

Paper—IX

(Advanced Statistical Inference)

Time : Three Hours] [Maximum Marks : 80

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

1. (A) (a) Define :—

(i) Non randomized decision rule.

(ii) As good as decision rule.

(b) Explain interval estimation as decision theory problem.

(c) Explain statistical decision problem with an example. What is use of loss function ? 5–6+5

OR

(B) (i) Define :—

(a) Randomised decision rule

(b) Optimal decision rule.

(ii) What is the role of risk function in decision theory ? Establish risk function in point estimation as decision problem.

(iii) Define loss function and discuss different types of loss functions used in theory. 5+6–5

2. (A) (a) Define :—

(i) Admissible decision rule

(ii) Complete class of decision rule

(iii) Essentially complete class of decision rule.

(b) Define Bayes and minimax decision rule. Also establish relationship between Bayes and minimax decision rule. 6+10

OR

(B) (i) Define :—

(a) Essentially complete class of decision rule.

(b) Minimal complete class of decision rule.

(ii) Explain minimax principle of ordering of decision rule with the help of graph of risk function. Explain the situation, when it fails; also define minimax decision rule. 6–10

3. (A) (a) Explain test of randomness. Describe its use in statistical inference theory. Also explain run test for randomness.

(b) Explain Kolmogorov-Smirnov one sample test. 8–8

OR

(B) (i) Compare χ^2 test of goodness of fit and Kolmogorov-Smirnov one sample test.

(ii) Explain Wilcoxon signed rank test. 8–8

4. (A) (a) Explain Mann Whitney Wilcoxon test.

(b) Explain sign test for two samples. State clearly the hypothesis tested in it. 8+8

OR

(B) (i) Explain median test for small samples.

(ii) Explain Wald-Wolfowitz run test. 8–8

5. (A) (a) Define linear rank statistic and explain its application in Mann-Whitney Wilcoxon test.

(b) Define Kernel. Write its use in developing theory of U statistic. 8–8

OR

(B) (i) Explain linear rank statistic and obtain its variance.

(ii) Derive variance of U statistic. 8–8