

M.A./M.Sc. Semester-IV (CBCS) Examination

STATISTICS

Paper-XIV

(Computational Statistics)

Time : Three Hours]

[Maximum Marks : 80

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

1. (A) (a) Explain the exploratory data analysis and compare it with classical data analysis.
 (b) Explain the construction of P-P plot. 8+8

OR

- (B) (i) Explain the purpose of transforming data and also explain when it is used.
 (ii) Explain the following :
 Stem leaf and box plot techniques. 8+8

2. (A) (a) Explain inverse transformation method to draw a random sample from probability distribution using an example.
 (b) Describe how Monte Carlo technique is used to find area of a circle. 8+8

OR

- (B) (i) Explain Acceptance Rejection technique.
 (ii) Define time Reversible Markov Chain. Explain the method of obtaining the same using Metropolis-Hastings algorithm. 8+8

3. (A) (a) Discuss the importance of simulated annealing procedure in Optimisation problem.
 (b) What do you mean by permutation test ? Discuss its use. 8+8

OR

- (B) (i) Discuss how simulation technique is used in testing of hypothesis.
 (ii) Explain simulated annealing for Markov chain. 8+8

4. (A) (a) Explain Jackknife estimator in regression.
 (b) For regression equation of the type $Y = X\beta + \epsilon$. Explain estimating parameter using Bootstrap method based on residue. 8+8

OR

- (B) (i) Define a delete one Jack-Knife estimator. Let $x_1, x_2, \dots, x_n$ be a random sample from $N(\mu, \sigma^2)$. Show that sample variance is a biased estimator for σ^2 but jackknife estimator removes bias for estimating σ^2 .
- (ii) Explain percentile method for the parameters of a linear regression model. (3+6)
5. (A) (a) Describe the theory of EM algorithm explaining the concept of expectation and maximization. Hence or otherwise state the EM algorithm.
- (b) Write a note on cross validation based on least squares (10+6)

OR

- (B) (i) Explain how EM algorithm is used to find MLE of parameter in incomplete data.
- (ii) What are the two approaches of estimating density function? Explain histogram as estimator of density function. (10+6)