M 24920

Reg. No. : .....

Name : .....

IV Semester M.A./M.Sc./M.Com. Degree (Reg./Sup./Imp.) Examination, March 2014

STATISTICS

Paper – 4.1 : Elective – 1: Advanced Operations Research

Time: 3 Hours Max. Marks: 70

Instructions : *1) Answer **any five** questions, choosing **one** from **each** Unit.*
*2) **All** questions carry **equal** marks.*

UNIT – I

1. a) Explain :
   i) Unrestricted search method and
   ii) Exhaustive search method.
   b) Find the maximum of the function $f(x) = 3 + 6x - 4x^2$ in $0 \le x \le 1$, using Fibonacci search plan with the smallest interval of uncertainty as 0.05. **(8+6)**

OR

2. a) Find the maximum of the function,

$$f(x) = \begin{cases} 4x & \text{if } 0 \le x \le 2 \\ 4 - x & \text{if } 2 \le x \le 4 \end{cases}$$

using dichotomous search method, assuming $\Delta = 0.05$.

   b) Discuss the random walk method in unconstrained optimization. **(8+6)**

UNIT – II

3. a) What is integer linear programming ? Explain the merits and demerits of 'rounding off' a continuous optimal solution to a LPP to obtain an integer solution.

P.T.O.

b) Explain Gomory's algorithm for solving pure integer programming problem. **(8+6)**

OR

4. a) Define a geometric programming problem and explain a method of solving it.

b) What is a stochastic programming problem ? Explain the method of solving a stochastic programming problem using chance constrained method. **(7+7)**

UNIT – III

5. a) State the need for inventories. Describe the optimization problem involved in the inventory model, clearly stating the objective function.

b) Describe a probabilistic inventory model with instantaneous demand and no set-up cost. Derive the optimum order quantity under such a model. **(6+8)**

OR

6. a) A baking company sells cake by kilogram weight. It makes a profit of Rs. 5 on every kilogram sold on the day it is baked. It disposes all cakes not sold on the day it is baked, at a loss of Rs. 1.20 per kilogram. If demand is known to be rectangular between 2000 and 3000 kg, determine the optimum daily amount baked.

b) Write short notes on :

i) Lot size

ii) Back orders

iii) Lost sales cases. **(5+9)**

UNIT – IV

7. a) Let m(t) be the mean residual life function and S(t) the survival function function of a continuous life time random variable T. Prove that $m(t) = \int_t^\infty \frac{S(x)}{S(t)} dx$ and deduce that $E(T) = \int_0^\infty S(x)\, dx$.

b) Define IFR and DFR distributions. Give an example each of a distribution which is IFR and DFR. Substantiate your answer. **(6+8)**

OR

8. a) Explain the different types of censoring commonly used in survival analysis.

b) Explain the Kaplan-Meier product limit estimator and mention its important properties. Also obtain the Greed Wood formula for the variance of this estimate. **(6+8)**

UNIT – V

9. Discuss the maximum likelihood estimation in the presence of Type I and Type II censoring assuming exponential distribution for survival time. **14**

OR

10. Carry out the parametric analysis under Gamma model with censored observation. **14**
