NRT/KS/19/5976

Bachelor of Arts (B.A.) Sixth Semester Examination
STATISTICS (OPERATIONS RESEARCH)
Optional Paper—1

Time : Three Hours]   [Maximum Marks : 50

N.B. :— ALL questions are compulsory and carry equal marks.

1. (A) Explain PERT in the context of project management. State its uses. Define the three time estimates of an activity and explain how these are used to calculate the probability of project completion. If a project has two or more critical paths then how is the variance of critical path calculated ?   10

OR

   (E) Explain the concept of float in network analysis. Also explain the following types of floats with definition, formula and its use :
   (1) Total float
   (2) Independent float
   (3) Free float
   (4) Interfering float.   10

2. (A) Define direct, indirect and total cost of a project. How does project duration affect these costs ? Discuss time-cost trade-off analysis.   10

OR

   (E) State a primal problem in canonical form and write its dual. Explain the primal-dual relationship. Prove that if either the primal or the dual has a finite optimal solution then the other also possesses the same and the optimal values of the objective functions of the two problems are equal.   10

3. (A) Define a balanced transportation problem. Explain the Vogel's approximation method of getting an initial basic feasible solution to it. Also explain MODI method of getting the optimum solution to the problem.   10

OR

   (E) Explain the N-W corner rule.
   (F) Write a short note on degeneracy in a transportation problem.
   (G) In which cells of the transportation table are the opportunity costs calculated ? Give the formula for calculating opportunity cost and interpret its value.
   (H) Explain stepping stone method for finding the optimal solution.   2½×4=10

4. (A) Define a game. What are the properties of a game ? Explain the 'Best Strategy' on the basis of minimax criterion.
   (B) Explain the Hungarian method of solving the assignment problem.   5+5

OR

   (E) Define an assignment problem. Show that it can be considered to be a particular case of transportation problem.
   (F) Define pure strategy and mixed strategy in case of a two-person zero-sum game. Define value of a game. When does it exist ?   5+5

5. Solve any *ten* of the following questions :
   (A) When is a dummy activity used in a network ?
   (B) What is the main difference in the approaches of CPM and PERT ?
   (C) What is meant by dangling in a network ? Show it with a diagram.
   (D) Show that dual of a dual is a primal.
   (E) What is meant by crashing an activity in a network ?
   (F) Define cost slope and give its use.
   (G) Write the dual of a transportation problem.
   (H) State the maximization transportation problem.
   (I) Why is the dummy source or dummy destination added in a transportation problem ?
   (J) Define a saddle point.
   (K) Define a competitive game and a pay off matrix.
   (L) For what value of t is the following game determinable ?

$$\begin{bmatrix} 2 & t \\ 4 & -7 \end{bmatrix}$$
                                                                                        1×10=10

CLS—289