Seat No. : _____

AE-128

April-2018

B.Sc., Sem.-VI

310 : Statistics
(Operations Research)

Time : 3 Hours] **[Max. Marks : 70**

Note : (i) Attempt **all** questions.
(ii) **All** questions carry equal marks.

1. (a) Define operations research and discuss its scope.

OR

What is the principle of duality in linear programming ? Explain its advantages.

(b) Describe simplex method of solving linear programming problems.

OR

Describe Big-M-method of solving linear programming problems. Also give its disadvantages.

2. (a) Explain Vogel's Approximation Method of solving a transportation problem.

OR

Explain the various steps of U-V method of solving a transportation problem.

(b) Explain Hungarian method for solving assignment problem.

OR

Explain the difference between a transportation problem and an assignment problem. Explain situations where an assignment problem can arise.

3. (a) Describe a method for determining the optimal sequence for processing of n jobs through k machines.

OR

What is no passing rule in a sequencing algorithm ? Explain the principal assumptions made while dealing with sequencing problems.

(b) Explain with examples the failure mechanism of items.

OR

Suppose the cost of maintenance of a machine increases with time and its scrap value is constant. If time is measured in discrete units, then show that the average annual cost will be minimized by replacing the machine when the next period's maintenance cost becomes greater than the current average cost.

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4. (a) Explain the following terms in PERT :

(i) Optimistic time

(ii) Most likely time

(iii) Pessimistic time

(iv) Expected time

(v) Variance in relation to activities

OR

Explain the following terms :

(i) Total float

(ii) Free float

(iii) Independent float

(iv) Critical path

(b) How does the PERT technique help a business manager in decision making ?

OR

State the circumstances where CPM is a better technique of project management than PERT.

5. Answer the following :

(i) What is an artificial variable and why it is necessary to introduce it ?

(ii) Define basic solution and degenerate solution in a linear programming problem.

(iii) What is degeneracy problem in transportation ?

(iv) Formulate transportation problem as a linear programming problem.

(v) Define sequencing problem.

(vi) Give a replacement situation.

(vii) Define dummy activity and critical activity.

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