

Code : 302403

BBA 4th Semester Exam., 2018

OPERATIONS RESEARCH AND LOGISTICS

Time : 3 hours

Full Marks : 60

Instructions :

- (i) All questions carry equal marks.
- (ii) There are **SEVEN** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question Nos. 1 and 2 are compulsory.

1. Choose the correct answer of the following (any six) :

- (a) For a linear programming equations, convex set of equations is included in the region of
 - ~~(i)~~ feasible solutions
 - (ii) disposed solutions
 - (iii) profit solutions
 - (iv) loss solutions
- (b) In graphical solutions of linear inequalities, solution can be divided into
 - ~~(i)~~ one subset
 - (ii) two subsets
 - (iii) three subsets
 - ~~(iv)~~ four subsets

(Turn Over)

- (c) In linear programming, objective function and objective constraints are
 - (i) solved
 - ~~(ii)~~ linear
 - (iii) quadratic
 - (iv) adjacent
- (d) Which technique is used in finding solution for optimizing a given objective such as profit maximization or cost minimization under certain constraints?
 - (i) Queuing theory
 - (ii) Waiting line
 - (iii) Both (i) and (ii)
 - ~~(iv)~~ Linear programming
- (e) The operations research technique, specially used to determine the optimum strategy
 - (i) decision theory
 - (ii) simulation
 - (iii) game theory
 - (iv) None of the above
- (f) Operations research approach is
 - (i) multi-disciplinary
 - (ii) scientific
 - (iii) initiative
 - (iv) All of the above

- (g) An optimization model
 - (i) provides the best decision
 - (ii) provides decision within its limited context
 - (iii) helps in evaluating various alternatives
 - (iv) All of the above

- (h) The distinguishing feature of an LP model is
 - (i) relationship among all variables is linear
 - (ii) it has single objective function and constraints
 - (iii) value of decision variables is non-negative
 - (iv) All of the above

(i) Transportation models can be used for which of the following decisions?

- (i) Facility location
- (ii) Production mix
- (iii) Media selection
- (iv) Portfolio selection
- (v) Employee shift scheduling

(Turn Over)

- (j) A transportation problem
 - (i) is a special case of the linear programming problem
 - (ii) can be solved by linear programming, but is solved more efficiently by a special-purpose algorithm
 - (iii) may give an initial feasible solution rather than the optimal solution
 - (iv) requires the same assumptions that are required for linear programming problems
 - (v) All of the above

2. Answer any three of the following :

- (a) Explain the scope and methodology of operations research.
- (b) Discuss the difference between decision making under certainty and decision making under uncertainty.
- (c) Describe the meaning of EMV and EVPI.
- (d) Discuss the role of sensitivity analysis in linear programming.
- (e) "Linear programming is one of the most frequently and successfully used operations research technique to managerial and business decisions." Elucidate.

3. "The primary contribution of the game theory has been its concept rather than its formal application for solving real problems." Explain.

4. Two products X and Y, both require processing time on machines I and II. Machine-I has 200 hours available and Machine-II has 400 hours available. Product X requires one hour on Machine-I and four hours on Machine-II. Product Y requires one hour on Machine-I and one hour on Machine-II. Each unit of product X yields ₹ 500 profit and each unit of Y yields ₹ 250. Formulate the problem as LPP.

5. Solve the following LP problem by using simplex method :

✓ Minimize :

$$Z = 4x_1 + 4x_2 - x_3$$

subject to

$$2x_1 + x_2 \geq 10$$

$$-3x_1 + 2x_2 \leq 6$$

$$x_1 + x_2 \geq 0$$

$$x_1, x_2 \geq 0$$

6. Belt snapping for conveyors in an open-cast mine occurs at the rate of 2 per shift. There is only one hot plate available for vulcanizing, and it can vulcanize on an average 5 belt-snaps per shift.

(a) What is the probability that when a belt snaps, the hot plate is readily available?

(b) What is the average number of belts in the system?

(c) What is the average waiting time of an arrival?

(d) What is the average waiting time plus vulcanizing time?

7. Explain the transportation and transshipment problems.

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