



Post Graduate Diploma in Logistics Management

Paper 6

OPERATIONS RESEARCH AND QUANTITATIVE TECHNIQUES IN LOGISTICS

Date : 09.06.2013
Time : 2.00 p.m. to 5.00 p.m.

Max Marks : 100
Duration : 3 hours

Instructions :

- 1) Answer all questions in PART A each question carries 1 mark Total 25 marks
 - 2) Attempt any five questions in PART B each question carries 15 marks 75 marks
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PART A

Q.1(A) State TRUE or FALSE:

[1 Mark Each]

- a) Probability is the study of random or nondeterministic experiments.
- b) A feasible solution is a solution for which all constraints are satisfied.
- c) Optimal solution does not have the most favorable values of the objective function.
- d) The time lag required to obtain the delivery of fresh supplies is Safety Stock.
- e) The Breakeven Point is the point where the sales volume generates huge amount of profit.
- f) Variable costs change in direct proportion to an activity level.
- g) An activity is an effort that requires resources and time for completion.
- h) Probability of a customer waiting in a queue can have a minimum value of zero.
- i) A project is a collection of activities and events with a definable beginning and a definable end.
- j) Trend is the general tendency of the data to increase or decrease or stagnate over a long period of time.

Q.1(B) Match the columns A & B:

[1 Mark Each]

(1) Transportation Problem	(A) Two variable LPP
(2) Inventory Management	(B) Exponential Distribution
(3) Graphical Method	(C) Safety Stock
(4) Hungarian Method	(D) Least Cost Method
(5) Service Rate	(E) Assignment Problem

Q.1(C) Fill in the blanks.

[1 Mark Each]

- a) North West Corner method is used to solve _____ Problem.
- b) Wherever there is a problem of _____, there is scope of application of Operations Research.
- c) The objective of Transportation Problem is to _____ cost.
- d) A _____ is a logical and chronological set of activities and events.
- e) _____ is period required to recover original cash outflow invested in a project.
- f) _____ costs remain unchanged within a relevant range of activity.
- g) _____ is imitation of reality.
- h) The selection of the appropriate order in which waiting customers are served is called _____.
- i) PERT stands for _____.
- j) CPM stands for _____.

PART B (any five)

[15 x 5 = 75 marks)

Q.2 Three jobs A,B,C are to be assigned to three machines X,Y,Z. The processing cost (INR) are shown in the matrix. Find the allocation which will minimize the overall processing cost.

		Machine		
		X	Y	Z
Jobs	A	19	28	31
	B	11	17	16
	C	12	15	13

Q.3 The cost of transportation per unit from three sources and four destinations are given in table as per below. Obtain the initial basic feasible solution using vogel's Approximation Method:

Source	Destination				Supply
	A	B	C	D	
1	2	3	11	7	6
2	1	0	6	1	1
3	5	8	15	9	10
Demand	7	5	3	2	17

Q.4 Five jobs are to be assigned to five men. The cost(in INR) of performing the job by ach man is given in table as per below. The assignment has restrictions the job 4 cannot be \ performed by man 1and job 3 cannot be performed by man4. Find the optimal assignment of job and its cost involved.

		Jobs				
		1	2	3	4	5
Men	1	16	12	11	x	15
	2	13	15	11	16	18
	3	20	21	18	19	17
	4	16	13	x	16	12
	5	20	19	18	17	19

Q.5 Solve the following by using Simplex Method.

Maximize

$$Z = 6x + 4y$$

Subject to –

$$2x + 3y \leq 120$$

$$2x + y \leq 60$$

Where $x, y \geq 0$.

Q.6 Auto car service provides a single channel water wash service. The incoming arrivals occur at the rate of 4 cars per hour and the mean service rate is 8 cars per hour. Assume that arrivals follow a Poisson distribution and the service rate follows an exponential probability distribution. Determine the following measures of performance:

- What is the average time that a car waits for water wash to begin?
- What is the average time a car spends in the system?
- What is the average number of cars in the system?

Q.7 The annual demand for machine is approximately 3600 items. Every time an order is placed , a fixed cost of INR 36/- is incurred. The holding cost per item inventory is 25% of the investment and unit price is INR 10/- . Determine EOQ and optimal cycle time.

Q.8 (a) What is payback period? How is it useful in decision making? What are the limitations of payback period?

(b) Solve the following problem by using Graphical Method:

Maximize $Z = 10x + 8y$

Subject to-

$$2X + y \leq 20$$

$$x + 3y \leq 30$$

$$2y - x \leq 15$$

Where $x, y \geq 0$.
