Post Graduate Diploma in Logistics Management

Paper 6

OPERARTION RESEARCH AND QUANTITATIVE TECHNIQUES IN LOGISTICS

Date : 10.06.2012   **Max Marks : 100**
Time : 2.00 p.m. to 5.00 p.m.   **Duration : 3 hours**

Instructions :
   1) Answer all questions in PART A   Total marks 25
   2) Attempt any five questions in PART B.   Total Marks 75

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PART A

Q.1 State TRUE or FALSE: [1 x20 = 20 marks]

   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 objective of Transportation Problem is to maximize cost.

   e) The selection of the appropriate order in which waiting customers are served is called sequencing.

   f) The time lag required to obtain the delivery of fresh supplies is Safety Stock.

   g) Payback Period is period required to recover original cash outflow invested in a project.

   h) The Breakeven Point is the point where the sales volume generates huge amount of profit.

   i) Fixed costs remain unchanged within a relevant range of activity.

   j) Simulation is imitation of reality.

   k) Any realistic business situation involves probabilistic or random features.

   l) Variable costs change in direct proportion to an activity level.

   m) An activity is an effort that requires resources and time for completion.

   n) Probability of a customer waiting in a queue can have a minimum value of zero.

   o)   North West Corner method is used to solve Assignment Problem.

   p) A network is a logical and chronological set of activities and events.

   q) A project is a collection of activities and events with a definable beginning and a definable end.

   r) Trend is the general tendency of the data to increase or decrease or stagnate over a long period of time.

   s) Jockeying customer moves from one queue to another thinking that he will get served faster by doing so.

   t) Wherever there is a problem of optimization , there is scope of application of Operations Research.

Q.2 Match the columns A & B: [1 x 5 = 5 Marks]

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

PART B

[Attempt any five - each question carries 15 Marks]

Q.4 An automobile company uses bolts at an approximate consumption rate of 2500 kg
per annum. The bolts cost Rs 30 per kg and the company estimates that it costs Rs
130 to place an order and the inventory carrying cost is 10% per annum. How
frequently should orders for bolts be placed and what quantity should be ordered?

Q.5 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.6 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 1andjob 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.7 Solve the following by using Simplex Method.

Maximize

Z= 6x+4y

Subject to –

2x+3y≤120
2x+y≤60

Where x,y≥0.

Q.8 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:

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

Q.9 A machine costs INR 500 to operate, while maintenance costs are zero for the first year , increasing by INR 100 every year. If the interest rate is 5% every year, determine the best age at which the machine should be replaced.

Q.10 (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 = 3x+4y

Subject to-

X+y≤450
2x+y≤600

Where x,y≥0.

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