Post Graduate Diploma in Logistics Management

Paper 6

OPERARTIONS RESEARCH AND QUANTITATIVE TECHNIQUES IN LOGISTICS

Date : 15.12.2013   **Max Marks : 100**
Time : 2.00 p.m. to 5.00 p.m.   **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   **25 marks**

Q.1 State TRUE or FALSE: **[1 Mark Each]**

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a) A feasible solution is a solution for which all constraints are satisfied.

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

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

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

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

f) Simulation is imitation of reality.

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

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

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

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

Q.2 Match the columns A & B: **[1 Mark Each]**

(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

Q.3 Fill in the blanks: **[1 Mark Each]**

a) CPM stands for _____.

b) PERT stands for _____.

c) Probability of a customer waiting in a queue can have a minimum value of _____.

d) NPV stands for _____.

e) ROI stands for _____.

f) EOQ stands for _____.

g) LPP is _____.

h) FIFO stands for _____.

i) North West Corner method is used to solve _____ problem.

j) The objective of transportation problem is to _____ the transportation cost.

PART B   75 marks
[Attempt any five. Each question carry15 Marks]

Q.4 (a) What are the advantages and limitations of Game Theory?

Q.4 (b) Mumbai Railway Station has a ticket counter. During the rush hours , customers arrive at the rate of 10 per hour. The average number of customers that can be served is 12 per hour. Find out the following:

(i) probability that the ticket counter is free

(ii) average number of customers in the queue.

Q.5 Find out the minimum cost of the below transportation problem by stepping stone method:

Source	Distributors			Supply
	A	B	C	
1	2	1	5	10
2	7	3	4	25
3	6	5	3	20
Demand	15	22	18	55

Q.6 (a) Explain the difference between a transportation and assignment problem.

Q.6 (b) The Njoy Toyz Company has four men available for work on separate jobs. Only one man can work on any one job. The cost of assigning each man to each job is given in the following table. Please assign men to jobs so that the total cost of assignment is minimum.

		Jobs			
		1	2	3	4
Men	A	20	25	22	28
	B	15	18	23	17
	C	19	17	21	24
	D	25	23	24	24

Q.7 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.8 (a) What are the characteristics and limitations of a linear programming problem?

Q.8(b) The Oswal Hardware sells fasteners of Rs 10,00,000/- annually. Ordering cost is Rs 2,500/- per order. Carrying cost is 12.5% of average inventory value. Find out optimal order size, number of orders per year and cycle period.

Q.9 (a) What is Operations Research? Discuss the advantages and limitations of Operations Research.
    (b) 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 using Graphical Method:

Maximize Z = 3x+2y

Subject to-

2X+y ≤ 100
x+y ≤ 80
x≤ 40

Where x,y≥0.

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