INDIAN INSTITUTE OF MATERIALS MANAGEMENT
Post Graduate Diploma in Materials Management
Graduate Diploma in Materials Management
Paper No. 2 (New)

June 2016

QUANTITATIVE TECHNIQUES AND OPERATIONS RESEARCH

Date: 12.06.2016 **Max .Marks: 100.**

Time: 2.00 to 5.00 p.m. **Duration: 3 hours**

Instructions:

1. The Question Paper is in two parts- Part A (compulsory) and Part B.
2. From Part A answer all the questions. Each question carries 1 mark, total 25 marks. (**Total Marks 25)**
3. From Part B answer any five questions out of 7 questions .Each question carries **15 marks, total 75 marks.**
4. Use of non-scientific calculator and/or mathematical tables is permitted.
5. Graph paper can be used wherever necessary.

PART A (25 x1 = 25 marks)

(Compulsory. Each sub-question carry 1 mark)

Q.1 State TRUE or FALSE: [15 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.

Q.2 Match the columns A & B: [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

Q.3 Write full form of the following: [5 Marks]

a) PERT; b) CPM; c) EOQ; d) LIFO; e) FIFO

PART B **(5 x15 = 75 marks)**

[Answer any five . Each question carry 15 Marks]

Q.4 List out the types of replacement policies. Define the term “PRESENT WORTH FACTOR’.

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:

	Destination				
Source	**A**	**B**	**C**	**D**	**Supply**
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 each 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.7 Solve the following by using Simplex Method.

Maximize
$Z= 3x+2y$

Subject to –

$x+y \leq 4$
$x-y \leq 2$

Where $x,y \geq 0$.

Q.8 What is Breakeven analysis? Discuss in detail.

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-

$X+y \leq 450$
$2x+y \leq 600$

Where $x,y \geq 0$.

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