INDIAN INSTITUTE OF MATERIALS MANAGEMENT

June 2017

Post Graduate Diploma in Materials Management

Graduate Diploma in Materials Management

Paper No. 2

QUANTITATIVE TECHNIQUES AND OPERATIONS RESEARCH

Date: 11.06.2017 **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)

Q 1. State true or false:

(a). Quantitative techniques help the manager in the process of decision making.

(b). Operations research basically employs mathematical models to analyze problems.

(c). An optimal solution is not a feasible solution.

(d). In an LPP the solution may take fractional as well as integral values.

(e). The simplex algorithm is an iterative procedure for finding the optimal solution to Linear programming problems.

(f). The free float is a part of the total float in an activity of a project.

(g). The assignment problem is a particular case of transportation problem.

(h). Hungarian method is used in transportation problems.

(i). The total elapsed time in sequencing of jobs is the time required to finish all jobs excluding the idle time if any.

(j). The values of decision variables in integer programming can be all integers.

(k). The basic method of solving a Goal programming problem is to convert it into a linear programming problem.

(l). Strategic decisions in an organization are short time decisions.

(m). If a non-critical activity is delayed up to its slack time the project

time changes.

(n). In non-pre-emptive service a customer is served immediately even shedding the

Service in operation

(o). A dummy activity in a project requires resources.

Q.2. Fill in the blanks:

(a) The stock of materials held by an organization to meet the demand or to produce the product is called_____.

(b) The critical path for a network of any project is the _____path Throughout the entire network.

(c) Customers moving from one queue to another to get faster service is Called _____of customers.

(d) Two person game in which the gain of one player is equal to the loss of another Player is called _____game.

(e) E O Q stands for _____'

Q. 3 – Abbreviate the following:

a) CPM
b) PERT
c) NPV
d) ROI
e) LPP

PART B

(answer any five) **(5 x15 = 75 marks)**

Q.4. (a) Maximize Z = 40 x + 35 y

Subject to 2 x +3 y <= 60. 4 x + 3 y <= 96. X ,y >= 0 by Graphical method

(b). Solve by Simplex method:

Maximize Z = 6 X + 3 Y

Subject to X + Y < = 7, 4 X + 3 Y < = 24, X, Y > = 0

Q.5 (a) When is a solution a Basic feasible solution in a transportation Problem, explain.

Q5 (b) Solve the Maximization Assignment problem. The table below gives the average Productions on four machine A, B, C, D by five operators.

Operators	A	B	C	D
1	10	5	7	8
2	11	4	9	10
3	8	4	9	7
4	7	5	6	4
5	8	9	7	5

Q.6 The average number of customers that can be processed by a cashier at A super market is 24 per hour whereas 20 customers on the average arrive per hour. Calculate:

(i) The average number of customers in the queuing system

(ii) The average time a customer spends in the queue.

Q.7 (a) What is meant by crashing of a project? Explain in brief.

(b) Draw a net-work for the Project with activities and durations in days for Completing the project.

Activity	1-2	2-3	2-4	3-4	3-5	4-5	5-6
Duration	7	8	12	4	6	4	12

(i) Determine the critical duration

(ii) What is the free float of the activity 3-5?

Q.8. Six jobs are to be processed on two machines, A and then on B. With the given number of processing hours for each job, determine the sequence of jobs for optimal elapsed time. Also find the total elapsed time.

Jobs >	I	II	III	IV	V	VI
Machine A	5	3	2	10	12	6
Machine B	3	2	5	11	10	7

Q.9. The maintenance cost per year and resale value every year of a machine whose purchase value is Rs.7000 is given below. If all conditions remain the same, after how many years the machine should be replaced every time ?

Year	1	2	3	4	5	6	7	8
Maintenance cost	900	1200	1600	2100	2800	3700	4700	5900
Resale value	4000	2000	1200	600	500	400	400	400

Q.10 The cost of a project is Rs. 150000. The annual earnings of the project are as given. Determine the pay-back period.

Year	1	2	3	4	5
Net Income (Rs)	60000	45000	30000	30000	30000

Q.11 Write short note on any two of the following

(i) Simulation

(ii) Advantages of inventory control

(iii) Capital budgeting

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