Printed Pages : 4

MB123/MB203

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 270203

Roll No.

M. B. A.

(SEM. II) THEORY EXAMINATION, 2014-15

OPERATIONS RESEARCH

Time : **3** Hours] [Total Marks : **100**

Note : Attempt question from each section, as per given instructions.

SECTION – A

1 Attempt any four parts of this section : **4×5=20**

(a) What is operations research?

(b) What do you understand by decision theory?

(c) Differentiate between assignment problem and transportation problem.

(d) What do you mean by non-degenerate solution in transportation problem?

(e) What is sequencing problem?

(f) What do you mean by pure strategy and mixed strategy?

270203] **1** **[Contd...**

SECTION – B

2 Attempt any two of the following : 15×2=30

(a) Solve the following LPP :

Max $Z = 30x_1 + 40x_2 + 20x_3$

s.t. $10x_1 + 12x_2 + 7x_3 \leq 10{,}000$

$7x_1 + 10x_2 + 8x_3 \leq 8000$

$x_1 + x_2 + x_3 \leq 1000$

where $x_1, x_2, x_3 \geq 0$

(b) The characteristics of a project schedule are as given below.

Activity	Time (days)	Activity	Time (days)
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

From the above :

(i) Construct a PERT network.

(ii) Compute earliest and latest expected time for each event.

(iii) Find the critical path.

(c) A company distributes its products by trucks loaded at its only loading station. Both, Company's trucks and contractor's is trucks are used for this purpose. It was found out that on an average every five minutes, on truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out :

(i) The probability that a truck has to wait.

(ii) The waiting time of truck that waits.

(iii) The expected waiting time of contractor's trucks per day, assuming a 24 hours shift.

SECTION – C

Note : Attempt All Questions from the section.   5×10=50

3   State the different kinds of situations under which business decisions are made.

<div align="center">OR</div>

3   The probability distribution of monthly sales of an item is as follows.

Monthly sales (units)	0	1	2	3	4	5	6
Probabilities	.01	.06	.25	.30	.22	.10	.06

4   What do you understand by an assignment problem ? Give the brief outline of solving it.

<div align="center">OR</div>

4   Solve the following assignment problem.

		I	II	III	IV	V
	A	1	3	2	3	6
	B	2	4	3	1	5
Task	C	5	6	3	4	6
	D	3	1	4	2	2
	E	1	5	6	5	4

(Man: I II III IV V)

5   Describe the method of processing n jobs through two machines.

<div align="center">OR</div>

5 We have five job, each of which must go through the machine A, B and C in the order ABC.

Processing times in hours

Job No. i	1	2	3	4	5
Machine A (Ai)	5	7	6	9	5
Machine B (Bi)	2	1	4	5	3
Machine C (Ci)	3	7	5	6	7

Determine a sequence for the jobs that will minimize the total elapsed time. Also calculate the total elapsed time.

6 Explain the graphical method of solving 2×n or m×2 games.

OR

6 Solve the game whose pay off matrix is given below :

$$\begin{array}{cccc} & & \text{Player B} & \\ & \text{I} & \text{II} & \text{III} \\ \text{I} & -5 & 10 & 20 \\ \text{Player A} \quad \text{II} & 5 & -10 & -10 \\ \text{III} & 5 & -20 & -20 \end{array}$$

7 What is the difference between group replacement and individual replacement? Under which circumstances group replacement may become profitable?

OR

7 A firm is using a machine whose purchase price is Rs. 13,000. the installation charges amount to Rs. 3,600 and the machine has a scrap value of only Rs. 1,600. because the firm has a monopoly. The maintenance cost in various years is given in the following table.

Year	1	2	3	4	5	6	7	8	9
Cost (Rs.)	250	750	1000	1500	2100	2900	4000	4800	6000

The firm wants to determine after how many years should the machine be replaced on economic consideration, assuming that the machine replacement can be done only at the year ends.

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