85E (OR)

[19-HBPGKOW–M3S(O) 20M]

MBA 3rd Semester (Old) Exam., 2019 (W)

OPERATION RESEARCH

[MBA 13]

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer any *five* from the following questions : 2×5=10

(a) Mention the two methods of simulation.

(b) Define 'feasible region'.

(c) State the importance of the duality concept in LPP.

(d) Define 'saddle point'.

(e) Write two basic differences between CPM and PERT.

(f) Define 'dummy activity'.

2. Answer any *three* from the following questions : 4×3=12

(a) What are the different phases of OR?

(b) Find the dual of the following LPP :

$$\text{Maximize } Z = 3x_1 - x_2 + x_3$$

subject to

$$\begin{aligned} 4x_1 - x_2 &\le 8 \\ 8x_1 + x_2 + 3x_3 &\ge 12 \\ 5x_1 - 6x_3 &\le 13 \\ x_1, x_2, x_3 &\ge 0 \end{aligned}$$

(c) Find the value of the following game :

		Player B		
		B_1	B_2	B_3
Player A	A_1	10	5	20
	A_2	65	50	40
	A_3	55	20	30

(d) Explain North-West corner rule.

3. Answer any *three* from the following questions : 6×3=18

(a) Write a short note on OR (Operation Research) describing some of its important techniques.

(b) Solve the following LPP using graphical method :

$$\text{Maximize } Z = 5x_1 + 3x_2$$

subject to

$$\begin{aligned} 3x_1 + 5x_2 &\le 15 \\ 5x_1 + 2x_2 &\le 10 \\ x_1, x_2 &\ge 0 \end{aligned}$$

(Continued)

(c) Solve the following assignment problem :

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

(d) Define the following :

(i) Total float

(ii) Free-float

(iii) Independent float

4. Answer any *four* from the following questions : 10×4=40

(a) Solve the following transportation problem :

Destination

		A	B	C	Supply
	1	5	1	7	10
Source	2	6	4	6	80
	3	3	2	5	15
	Demand	45	20	40	

(b) Solve the following game using the principle dominance :

Player B

Player A	B_1	B_2	B_3
A_1	1	7	2
A_2	6	2	7
A_3	6	1	6

(c) A project schedule has the following characteristics :

Activity	0–1	1–2	1–3	2–4	2–5
Duration (days)	3	8	12	6	3

Activity	3–4	3–6	4–7	6–7
Duration (days)	3	8	5	8

(i) Draw the network diagram.

(ii) Find the critical path and the total project duration.

(iii) Find the total float and free-float of each activity. 2+4+4=10

(d) Define OR. Discuss the scope and limitations of OR. 2+8=10

(e) What is simplex method? Explain the simplex algorithm to solve LPP. 2+8=10

★★★