Roll No. .....

12026

MBA 2 Year 2nd Semester (Old)

Re-Appear Examination – October, 2020

OPERATION RESEARCH

Paper : 16IMG22C6

Time : 1.45 hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any ***three*** questions. All questions carry equal marks.

1. (a) What is degeneracy in transportation problem ?

(b) Differentiate between PERT and CPM.

(c) What is two person zero-sum game ?

(d) Differentiate between an activity and an event.

(e) What is a decision tree ?

(f) What does critical path denote ?

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(g) What is difference between maximization and minimization transportation problems ?

(h) What is Laplace criteria of decision making ?

2. (a) Define Operations Research. Discuss how the techniques of Operations Research help in decision making.

(b) The Handy-Dandy Company wishes to schedule the production of a kitchen appliance that requires two resources - labour and material. The company is considering three different models and its production engineering department has furnished the following data :

	Model		
	A	B	C
Labour (hours per unit)	7	3	6
Material (pounds per unit)	4	4	5
Profit ($ per unit)	4	2	3

The supply of raw material is restricted to' 200 pounds per pay. The daily availability of labour is 150 hours. Formulate this as a linear programming model.

3. Use the big- M method to solve the following linear programming problem :

Maximize $z = 3x_1 + 2x_2 + 3x_3$

Subject to $2x_1 + x_2 + x_3 \leq 2$

$3x_1 + 4x_2 + 2x_3 \geq 8$

$x_1, x_2, x_3 \geq 0$

4. Solve the following cost-minimizing transportation problem :

	D_1	D_2	D_3	Supply
O_1	10	9	8	8
O_2	10	7	10	7
O_3	11	9	7	9
O_4	12	14	10	4
Demand	10	10	8	

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5. Four salespersons A, B, C and D are to be sent to visit four companies 1, 2, 3 and 4. Each salesperson will visit exactly one company, and all companies will be visited.

Previous sales figures show that each salesperson will make sales of different values, depending on the company that they visit. These values (in £10 000s) are shown in the table below :

	1	2	3	4
Ann	26	30	30	30
Brenda	30	23	26	29
Connor	30	25	27	24
Dave	30	27	25	21

(a) Use the Hungarian algorithm to obtain an allocation that maximizes the sales. You must make your method clear and show the table after each stage.

(b) State the value of the maximum sales.

(c) Show that there is a second allocation that maximises the sales.

6. A project is represented by the network shown below has the following data for Mast Ltd. :

Task	A	B	C	D	E	F	G	H	I
Optimistic Time	5	18	26	16	15	6	7	7	3
Pessimistic Time	10	22	40	20	25	12	12	9	5
Most likely Time	8	20	33	18	20	9	10	8	4

Determine the following :

(i) Expected task times and their variance

(ii) The critical path

7. Draw network diagrams from the following list or activity for Zoom Ltd. :

Activity	Predecessor Activity		
A	–	–	–
B	–	–	–
C	–	–	–

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D	A	A	A
E	B	A, B	A, B
F	B, C	A, B, C	B, C
G	D, E, F	D, E, F	C
H	E, F	F	D, E, F

8. The payoff matrix of a game is given. Find the solution of the game to the player A and B.

$$\begin{array}{cc} & B \\ A & \begin{pmatrix} & I & II & III & IV & V \\ I & -2 & 0 & 0 & 5 & 3 \\ II & 3 & 2 & 1 & 2 & 2 \\ III & -4 & -3 & 0 & -2 & 6 \\ IV & 5 & 3 & -4 & 2 & -6 \end{pmatrix} \end{array}$$

9. (a) Solve the following game :

A	B	
	4	–4
	–4	4

(b) (i) Write about the rules of dominance.

(ii) Solve the following game :

		Player W			
		I	A	B	C	D
Player Y	II	–5	3	1	20
	III	5	5	4	6
	IV	–4	2	0	–5

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