

Hall Ticket No

--	--	--	--	--	--	--	--	--	--

Question Paper Code: CMB011



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

MBA III Semester End Examinations (Regular) - November, 2018

Regulation: IARE-R16

Quantitative Analysis for Business Decisions

Time: 3 Hours

(MBA)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- Describe important features of Operation Research. [7M]
 - State and explain classification of different models available in practice of Operations Research. [7M]
- Describe important phases of Operations Research. [7M]
 - Discuss in brief various applications and scope of Operations Research in business scenario. [7M]

UNIT – II

- The LPP model with an objective function of $\text{Max } Z=40X_1+35X_2$ has a feasible region covered by OABC points in graphical method. Find the value of X_1 , X_2 and Maximum Z. The following are the ordinates of points O(0,0), A(5,20), B(18,8) and C(24,0). If the Objective is to minimise what is change in values of X_1 , X_2 and Min Z. [7M]
 - From the following simplex table find whether the solution is leading to an optimal solution? [7M]

Table 1

C _j		2	4	0	0	-M	-M	
	Basis	X ₁	X ₂	S ₁	S ₂	R ₁	R ₂	b _J
0	S ₁	0	0	1	3/4	-3/4	1/4	2
2	X ₁	1	0	0	-1/2	1/2	-1/2	2
4	X ₂	0	1	0	1/4	-1/4	3/4	12
Δ _j		?	?	?	?	?	?	Max Z= ?

4. (a) Find the non-degenerate initial solution by Vogel's Approximation Method to the following transportation problem shown in Table 2. [7M]

Table 2

Factory/ Warehouse	W1	W2	W3	W4	Supply
A	4	5	2	5	120
B	3	8	4	8	80
C	7	4	7	4	200
Demand	60	50	140	50	

- (b) Is the following Table 3 initial solution optimal? Check using MODI method. [7M]

Table 3

From/ To	W1	W2	W3	W4	Slack/Dummy	Supply
A	4	5	2(120)	5	0	120
B	3(60)	8	4	8	0(20)	80
C	7	4(50)	7(20)	4(50)	0(80)	200
Demand	60	50	140	50	100	

UNIT – III

5. (a) Describe the steps followed in solving an Assignment model by Hungarian method. [7M]
 (b) Find the optimal solution to assignment problem shown in Table 4 value are given in minutes. [7M]

Table 4

Men / Work	A	B	C	D
W1	45	40	51	67
W2	55	40	61	53
W3	49	52	48	64
W4	41	45	60	55

6. (a) Describe how a travelling salesman model is different from assignment model. [7M]
 (b) Find the optimal route to the following travelling salesman shown in Table 5. model [7M]

Table 5

	A	B	C	D
A	X	4	7	3
B	4	X	6	3
C	7	6	X	7
D	3	3	7	X

UNIT – IV

7. (a) Describe the criterion of optimism and criterion of pessimism with an example. [7M]
 (b) Solve the following Table 6 using Min-Max regret criterion values given in Lakhs. [7M]

Table 6

Nature Strategies	N1	N2	N3
S1	7	3	1.5
S2	5	4.5	0
S3	3	3	3

8. (a) Differentiate payoff matrix and decision tree? Is there any benefit in representing a decision problem in either of these forms? Under what circumstances is a decision tree a better representation than a decision problem. [7M]
 (b) The following information available related to a goods transport system shown in Table 7. Lorries have fixed cost of Rs. 90/- per day and variable cost of Rs.200. If the lorry owner has 4 vehicles, what are its daily expectations? If it is start new business without any Lorries how many Lorries he has to buy? [7M]

Table 7

Number of lorry demand	0	1	2	3	4
Probability	0.1	0.2	0.3	0.2	0.2

UNIT – V

9. (a) Describe the general structure of queuing system with an example. [7M]
- (b) Arrivals at telephone booth are considered to be Poisson with an average time of 10 minutes between one arrival and next. The length of phone call is assumed to be exponentially distributed with a mean time of 3 minutes. [7M]
- i. What is the probability that a person arriving at the booth will have to wait?
 - ii. What is the average length of queue?
 - iii. What is the expected number of customers in the system?
 - iv. If the waiting time in the queue is 3 minutes for what increase in arrival pattern then a second counter is installed?
10. (a) Describe the various service process in queuing theory followed in practice with an example. [7M]
- (b) In machine maintenance, a mechanic repairs four machines. The mean time between service requirement is 5 hours for each machine and forms an exponential distribution. The men repair time is one hour and also follows the same distribution pattern. Machine down time cost Rs. 25/- per hour and the mechanic costs is Rs 55/- per day of 8 hours. [7M]
- i. Find the expected number of operating machines.
 - ii. Determine expected down time cost per day