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Question Paper Code: CMB011

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

MBA III Semester End Examinations (Supplementary) - April, 2019

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

1. (a) Describe the different steps followed in OR Model to provide better solution. **[7M]**
   (b) List important Features and limitations of OR solutions. **[7M]**
2. (a) State and explain classification of different Models available in Practice. **[7M]**
   (b) Explain the origin of OR in brief and write ts applications. **[7M]**

UNIT – II

3. (a) A company is producing three products A,B and C. Formulate an LPP model to maximise the Profit for the following collected data given in Table 1; **[7M]**

Table 1

Factor	A	B	C	Availability
Selling Price/unit	500	300	400	
Raw Material /unit	15 units	5 units	10 Units	more than 2000 units
Labor Hours/Unit	8	4	5	Less than 1200Hrs.
Machine Hours/Unit	4	2	3	200 Hrs.

   (b) Solve the following LPP by graphical method **[7M]**
   Max Z=5x+3y
   Subject to constraints
   $2x+y \leq 1000$
   $x \leq 400$
   $y \leq 700$
   $x,y \geq 0$

4. (a) Find the non-degenerate Initial solution by VAM to the following TPM Table 2. **[7M]**

Table 2

Factory/ Warehouse	W1	W2	W3	Supply
A	6	4	1	50
B	3	8	7	40
C	4	4	2	60
Demand	20	95	35	

(b) Is the following Initial solution given in Table 3 is Optimal? Check using MODI method **[7M]**

Table 3

From/ To	W1	W2	W3	Supply
A	6	4(15)	1(35)	50
B	3(20)	8(20)	7	40
C	4	4(60)	2	60
Demand	20	95	35	

UNIT – III

5. (a) Describe the steps in solving a Maximisation Assignment model by Hungarian method. **[7M]**

(b) Find the optimal solution to following Maximisation assignment problem given in Table 4. (sales in 000 value)

[7M]

Table 4

	A	B	C	D	E
W1	32	38	40	28	40
W2	40	24	28	21	36
W3	41	27	33	30	37
W4	22	38	41	36	36
W5	29	33	40	35	39

6. (a) Describe the Travelling Salesman model with one example. **[7M]**

   (b) Find the optimal route to the following Travelling salesman model given in Table 5 **[7M]**

Table 5

	A	B	C	D
A	X	12	17	3
B	12	X	6	3
C	17	6	X	7
D	3	3	7	X

UNIT – IV

7. (a) With an example describe the Criterion of Pessimism **[7M]**

   (b) Solve the following Table 6 using Min-Max regret criterion values given in Lakhs.. **[7M]**

Table 6

Strategies Nature	S1	S2	S3
N1	17	13	12
N2	15	14	10
N3	13	15	13

8. (a) Discuss the various types of decision making environments in detail along with different decision making techniques. **[7M]**

   (b) The following information given in Table 7 available related to a Rental car system. Cars have fixed cost of Rs. 400/- per day and variable cost of Rs.800. If the rental car owner has 4 vehicles, what are its daily expectations? If it is required to start new business without any cars how many cars he has to buy?

[7M]

Table 7

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

UNIT – V

9. (a) Describe the operating characteristics of Queuing system with an example **[7M]**

   (b) Describe the various service process followed in practice with one example . **[7M]**

10. (a) What is queue system and explain various applications of queuing models. **[7M]** Arrivals at Railway Ticketing booth are considered to be Poisson with an average time of 5 minutes between one arrival and next. The length of service is assumed to be exponentially distributed with a mean time of 4 Minutes. **[7M]**

    i. What is the probability that a person arriving at the ticket 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 average time spent by customer in queue is more than 5 minutes a second Ticket booth will be operated. Is second Ticket booth is required?