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**M. B. A. (Fourth Semester) Examination,
April-May 2020**

(New Scheme)

(Specialization : General)

(Management Branch)

ECONOMETRICS & DECISION SCIENCE (New)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 32

Note : There are three questions in each unit (a), (b) and (c). Question (a) is compulsory for each unit and carries two marks each. Attempt any one question from (b) and (c) for each unit which carries 14 marks each.

Unit-I

1. (a) Explain the term econometrics.

2

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(b) Given below is the transaction matrix showing input output analysis :

Producing Sector	Receiving sector			Final Demand	Total Output
	A	B	C		
A	20	100	50	30	200
B	100	20	30	250	400
C	30	40	10	120	200
Labour	50	240	110		

Construct the technological matrix and explain how to compute the gross output levels of all the sectors. If the final demand of sector C changes to 125 million.

14

(c) "Input-output method is unique among forecasting methods in that it reflects intra-industry relationship." Comment.

14

Unit-II

2. (a) What do you understand by two person zero sum game?

2

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

14

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Player B

		I	II	III	IV	V	VI
Player A	1	4	2	0	2	1	1
	2	4	3	1	3	2	2
	3	4	3	7	-5	1	2
	4	4	3	4	-1	2	2
	5	4	3	3	-2	2	2

(c) Solve the game :

14

Player B

		1	2	3
Player A	1	1	-1	-1
	2	-1	-1	3
	3	-1	2	-1

Unit-III

3. (a) Write any two assumptions of Markov chain analysis.

2

(b) A market research organization studied the car purchasing trends in a certain region, with a conclusion that a new car is purchased, on an average, once every 4 years. The buying pattern of the customer is as follows :

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Of the current small car owners, 80% will replace the car again with a small car and 20% with a large car. Similarly, 60% of the large car users will replace it with a small car while 40% will replace it with another large car. Assuming the market and the preferences remaining the same :

- (i) Construct the transition matrix.
- (ii) If there are currently 40,000 small cars and 20,000 large cars in the region, what will be the distribution in 8 years from now.
- (iii) Find the probability that a person presently using a small car will buy a large car in the next to next purchase. 14

- (c) A housewife buys three kinds of cereals C_1 , C_2 , C_3 . It is known that she never buys the same cereal on successive weeks. If she buys cereal C_1 , then the next week she buys cereal C_2 . However, if she buys C_2 or C_3 , then the next week she is thrice as likely to buy C_1 as the other brand. Obtain the transition probability matrix and determine how often she would buy each of the cereals in the long run. 14

Unit-IV

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4. (a) What is EMV? 2
- (b) A major consumer goods manufacturer wishes to decide which of the two new products to bring out in the market and what level of advertisement to use the profitables for this products are as follows : 14

(Profits are in units of Rs. 10000)

Demand		Ozone			Life		
		A ₁	A ₂	A ₃	A ₁	A ₂	A ₃
S ₁	High	140	160	200	200	210	230
S ₂	Average	100	130	160	160	170	190
S ₃	Low	80	120	140	120	130	140

Where :

- A₁ = Low expenditure advertisement program.
- A₂ = Medium expenditure advertisement program.
- A₃ = High expenditure advertisement program.

The prior probability distribution are as follows :

Demand	Ozone	Life
S ₁	0.40	0.20
S ₂	0.50	0.20
S ₃	0.10	0.60

Calculate

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- (i) Which product and advertisement level would you recommend?
- (ii) What is the expected value of perfect information for each product?
- (c) A businessman has two independent investments A and B available to him, but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop, or if A is successful then take B, or vice versa. The probability of success on A is 0.70, while for B it is 0.40. Both investment require an initial capital outlay of Rs. 2,000 and both return nothing if the venture is unsuccessful. Successful completion of A will return Rs. 3,000 (over cost) successful completion of B will return Rs. 5,000 (over cost). Draw the decision tree and determine the best strategy. 14

Unit-V

5. (a) What do you mean by Simulation? 2
- (b) The management of ABC company is considering the question of marketing a new product. The fixed cost required in the project is Rs. 4,000. Three factors are uncertain viz, the selling price,

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variable cost and the annual sales volume. The product has a life of only one year. The management has the data on these three factors are as under :

Selling Price (Rs.)	3	4	5
Probability	0.20	0.50	0.30
Variable Cost (Rs.)	1	2	3
Probability	0.30	0.60	0.10
Sales Volume (units)	2000	3000	5000
Probability	0.30	0.30	0.40

Consider the following sequence of thirty random number :

81 32 60 : 04 46 31 : 67 25 24
 59 66 90 : 12 64 79 : 31 86 68
 10 40 02 : 39 68 08
 82 89 25 : 11 98 16

Using the sequence (first 3 random number for the first trial etc.). Simulate the average profit for the above project on the basis of 10 trials. 14

- (c) The fit-fit scientific laboratories is engaged in producing different types of high class equipment for use in science laboratories. The company has two different assembly lines to produce its most

popular product 'pressure XI'. The processing time for each of the assembly line is regarded as a random variable and is described by the following distributions.

Process Time (min)	Assembly A ₁	Assembly A ₂
01 10	0.10	0.20
02 11	0.15	0.40
03 12	0.40	0.20
04 13	0.25	0.15
05 14	0.10	0.05

Using the following random numbers, generate data on the process time for 15 units of the item and compute the expected process time for the product. The purpose read the number vertically taking first two digits for the processing time on assembly A₁ and the last two digits for processing time on Assembly A₂ :

14

4134 8343 3602 7505 7428
 7476 1183 9445 0089 3424
 4943 1915 3415 0880 9309