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

(New Course)

(Specialization : General)

(Management Branch)

ECONOMETRICS and DECISION SCIENCE

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 32

***Note** : All Part A, B & C are compulsory. Solve any **five** from Part A. Any **five** from Part B and any **four** from Part C. Part A (5 × 2), Part B (5 × 6) and Part C (4 × 10).*

Part-A **5×2=10**

***Note :** Attempt any **five**.*

1. (a) Define Econometrics. 2

(b) What do you mean by National Incom Accounting Matrix? 2

(c) Discuss about Two-Person Zero-Sum Game. 2

(d) What do you mean by Payoff Matrix? 2

(e) Point out the Rules of Decision in Decision theory. 2

(f) Explain Markov chain with example. 2

(g) Explain the basic concept of simulation. 2

Part-B **5×6=30**

Note : *Attempt any* ***five.***

2. (a) What are the steps involve in Econometrics? 6

(b) Write short notes on : 6

(i) Pure and Mixed strategies

(ii) Stationarity of transition Probabilities.

(c) Find the demand vector D consistent with the output vector (25, 21, 18) and the technology coefficient matrix :

$$[A] = \begin{bmatrix} 0{\cdot}2 & 0{\cdot}3 & 0{\cdot}2 \\ 0{\cdot}4 & 0{\cdot}1 & 0{\cdot}2 \\ 0{\cdot}1 & 0{\cdot}3 & 0{\cdot}2 \end{bmatrix}$$

Test whether the Hawkin-Simon conditions for viability of the system are satisfied. 6

(d) Solve the following game using the graphical method : 6

$$A\text{'s strategy} \begin{matrix} \\ a_1 \\ a_2 \\ a_3 \\ a_4 \end{matrix} \begin{matrix} b_1 & b_2 \\ \end{matrix} \begin{bmatrix} -7 & 6 \\ 7 & -4 \\ -4 & -2 \\ 8 & -6 \end{bmatrix}$$

(e) A market survey is made on two brands of breakfast foods A and B. Every time a customer purchases, he may buy the same brand or switch to another brand. The transition matrix is given below.

From	To A	To B
A	0·8	0·2
B	0·6	0·4

Determine the market shares of brand *A* and brand *B* in the steady state. 6

(f) A television dealer finds that the cost of a TV in stock for a week is ₹ 30 and the cost of a unit shortage is ₹ 70 for one particular model of television the probability distribution of weekly sales is as follows :

Weekly sales :	0	1	2	3	4	5	6
Probability :	0·10	0·10	0·20	0·25	0·15	0·15	0·05

How many units per week should the dealer order? Also find EVPI. 6

(g) A bakery keeps stock of a popular brand of cakes. Previous experience shows the daily demand pattern for the item with associated probabilities, as given :

Daily demand (Nos.) :	0	10	20	30	40	50
Probability :	0·01	0·20	0·15	0·50	0·12	0·02

Use the following sequence of random numbers to simulate the demand for next 10 days. Also find out the average demand per day. 6

Random numbers : 25, 39, 65, 76, 12, 05, 73, 89, 19, 49

Part-C **4×10=40**

*Note : Attempt any **four**.*

3. (a) The input-output table of a two-product economy is given below. Determine the gross output level of the commodities and total mondays required.

	Consumer		Final
	Product	Product	Demand
Producer	1	2	
Product 1	0·5	0·2	100
Product 2	0·4	0·6	150
Labour	5	4	

Calculate : 10

(i) Gross output level

(ii) Mondays require

(iii) If wage is ₹ 10 per day then how much amount require for the system.

(iv) Value added.

(b) Determine the optimal strategies and the value of the game from the following 4 × 4 pay-off matrix game. 10

X	Y			
	Y_1	Y_2	Y_3	Y_4
X_1	–5	16	13	15
X_2	20	–5	60	–70
X_3	–5	9	12	10
X_4	–20	–2	50	–80

(c) There are three firms ABC, PQR and XYZ sharing a market as 40%, 40% and 20% respectively on January 1, 2009. Over a year the following development take place :

ABC retains 80% of its customers, loses 16% to PQR and 4% to XYZ.

PQR retains 84% of its customers, loses 12% to ABC and 4% to XYZ.

XYZ retains 76% of its customers, loses 18% to ABC and 6% to PQR.

Find : 10

(i) Graphic presentation of transition probabilities.

(ii) What share of the market shall be held by each firm on January 1, 2011.

(d) A Finance Manager is considering drilling a well. In the past only 70% of wells drilled were successful at 20 meters depth in that area. Moreover on finding no water at 20 meters, some persons in that area drilled it further upto 25 meters but only 20% struck water at that level. The prevailing cost of drilling is ₹ 500 per meter. The Finance Manager estimated that in case he does not get water in his own well he will have to pay ₹ 15,000 to buy water from outside for the same period of getting water from the well. The following decisions are considered :

(i) Do not drill any well

(ii) Drill upto 20 meters and

(iii) If no water is found at 20 meters, drill further upto 25 meters.

Draw an appropriate decision tree and determine the Finance Managers optimal strategy. 10

(e) What is Simulation? Describe the simulation process. State the major two reasons for using simulation to solve a problem. What are the advantages and limitations of simulation? 10

(f) Write short notes on : 10

(i) Marov process

(ii) Fold back or Roll back process