

26023802



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Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, MAY 2026

Fourth Semester

Faculty of Science

Branch I (A)—Mathematics

MT04E05—MATHEMATICAL ECONOMIC

(2016—2018 Admissions—Mercy Chance)

Time : Three Hours

Maximum Weight : 30

Part A

*Answer any **five** questions.*

Each question carries 1 weight.

1. What are indifference curves and what they are used for ?
2. What is consumer equilibrium ?
3. What are production functions ?
4. What is law of variable proportion ?
5. What are implicit and explicit costs.
6. What is input-output table ?
7. Write the general formula for solution of a first order linear difference equation.
8. What is a difference equation ?

(5 × 1 = 5)

Part B

*Answer any **five** questions.*

Each question carries 2 weight.

9. (a) With what is consumer demand theory concerned ?
(b) Why do we study consumer demand theory ?

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10. What constraints or limitations does the consumer face in seeking to maximize the total utility from personal expenditures.
11. Define isoquants and what are its characteristics.
12. In terms of “Labour” and “Land” what does the law of diminishing returns state.
13. What are the main features of input output analysis.
14. Determine the total demand for industries 1, 2 and 3, given the matrix of technical co-efficients A and the final demand vector B below :

$$A = \begin{matrix} & \begin{matrix} 1 & 2 & 3 \end{matrix} \\ \begin{matrix} \begin{bmatrix} 0.4 & 0.3 & 0.1 \\ 0.2 & 0.2 & 0.3 \\ 0.2 & 0.4 & 0.2 \end{bmatrix} \end{matrix} & \begin{matrix} 1 \\ 2 \\ 3 \end{matrix} \end{matrix} \begin{matrix} \text{Input} \\ \text{Industry} \end{matrix}$$

$$B = \begin{bmatrix} 140 \\ 220 \\ 180 \end{bmatrix}.$$

15. (a) Solve the following difference equation ;
- (b) Check the answer using $t = 0$ and $t = 1$; and
- (c) Comment on the nature of the time path

$$5y_t + 2y_{t-1} - 140 = 0, y_0 = 30.$$

16. (a) Derive the formula for the value p_t of an initial amount of money p_0 deposited at ‘ i ’ interest for ‘ t ’ years when compounded annually.
- (b) Give some applications of difference equation in economic models.

(5 × 2 = 10)





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Part C*Answer any **three** questions.**Each question carries 5 weight.*

17. (a) From the Tu_x schedule in table below : (i) Derive the Mu_x schedules ; and (ii) Plot the Tu_x and Mu_x schedules and indicate the saturation point.

Q_x	0	1	2	3	4	5	6	7	8	9
Tu_x	0	7	13	18	22	25	27	28	28	27

- (b) Explain the revealed preference theory of demand.
18. (a) From the table below find the AP and MP of labor and plot the TP, the AP and the MP of labor :

Land	1	1	1	1	1
Labour	1	2	3	4	5
TP_{Labour}	10	18	24	28	30

- (b) State and prove Euler's Theorem.
19. (a) Discuss the properties of cobb-Douglas production function.
- (b) Explain CES production function.
20. Explain Leontief's static model with an example.
21. Given the inter industry transaction demand table below :
- (a) Find the matrix of technical co-efficients.

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(b) Check your answer :

<i>Sector of Origin</i>	<i>Sector of Destination</i>			<i>Final Demand</i>	<i>Total Demand</i>
	1	2	3		
1	20	60	10	50	140
2	50	10	80	10	150
3	40	30	20	40	130
Value added	30	50	20		
Gross Production	140	150	130		

22. (a) Describe the Harrod model.

(b) The level of income y_t for any period ; and (ii) The warranted rate of growth.

$$I_t = 2.66 (Y_t - Y_{t-1}), S_t = 0.16 Y_t, Y_0 = 900.$$

(3 × 5 = 15)

