

G 17001241



17001241

Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, MAY 2017

Fourth Semester

Faculty of Science

Branch I(A)—Mathematics

MT 04E 05—MATHEMATICAL ECONOMICS

(2012 Admissions—Regular)

Time : Three Hours

Maximum Weight : 30

Part A

Answer any five questions.

Each question has weight 1.

1. Describe the Marginal rate of substitution. How do we calculate it from the utility function.
2. Define consumer equilibrium with example.
3. Explain Isoquants with diagrams.
4. Explain Ridge lines.
5. Describe Leontief dynamic model.
6. What is the meaning of input-output.
7. Define a linear difference equation. What are fundamental set of solutions ?
8. Discuss the behaviour of the solution sequence.

(5 × 1 = 5)

Part B

Answer any five questions.

Each question has weight 2.

9. Explain the Lagrangian multiplier method to maximize the utility function subject to the budget constraint.
10. An individual's utility function is $U = 2gx + 2fy - ax^2 - 2hxy - by^2$. Show that his demands for the goods are linear in the income.
11. What is C.E.S Production function ? Find the elasticity of substitution for the C.E.S production function.

Turn over





G 17001241

12. Consider Cobb-Douglas production function for two goods $Y_1 = L_1^{\alpha_1} K_1^{1-\alpha_1}$ and $Y_2 = L_2^{\alpha_2} K_2^{1-\alpha_2}$ where $\alpha_1 = 1/4$ and $\alpha_2 = 3/4$ are the capital shares of the two industries. Find the equilibrium conditions for the cost minimization.
13. Prove that marginal product is always equal to the average product when the average product is maximum.
14. Find the output for the input multiplier (A) and final demand (F) given by
- $$A = \begin{bmatrix} 0.4 & 0.6 & 0.2 \\ 0.3 & 0 & 0.1 \\ 0.3 & 0.1 & 0.2 \end{bmatrix} \text{ and } F = \begin{pmatrix} 80 \\ 60 \\ 40 \end{pmatrix}$$
15. Solve the difference equation $4y_{x-1} - y_x + 2 = 0$.
16. Explain Harrod model.

(5 × 2 = 10)

Part C

Answer any **three** questions.

Each question has weight 5.

17. (a) Prove that if all prices and income change in the same proportion, the quantity demanded is the same.
- (b) Find the stationary values for the function $U = 4x^2 - xy + y^2 - x^3$.
18. (a) State and prove Euler's theorem.
- (b) Explain the nature and meaning of the production function.
19. (a) Explain the law of variable proportions. Discuss the phases and assumptions.
- (b) Find the Marginal rate of technical substitution for a Cobb-Douglas production function.
20. Technology matrix for the input-output model is given by :

	Sector 1	Sector 2	Final Demand
Sector 1	0.25	0.40	F1
Sector 2	0.14	0.12	F2
Labour	0.9	0.6	

If final demand $F_1 = 0.4y + 60$ and $F_2 = 0.5y + 100$, Find the equilibrium income and output of the different sectors. Compare the results if $F_1 = 120$, $F_2 = 150$.





G 17001241

21. (a) Technology matrix for the input-output model is given by :

	Sector 1	Sector 2	Final Demand
Sector 1	140	30	30
Sector 2	40	180	80
Primary inputs	20	90	

find the output of each sector

- (b) Explain Leontief's models with an example. Explain how matrix algebra is useful in studying this model.
22. (a) Explain the method of solution for the first order linear difference equation.
- (b) Explain the general Cobweb model.

(3 × 5 = 15)

