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M.Sc. DEGREE (C.S.S.) EXAMINATION, JUNE 2016

Fourth Semester

Faculty of Science

Branch I (A)—Mathematics

MT 04 E05—MATHEMATICAL ECONOMICS

(2012 Admissions—Regular)

Time : Three Hours

Maximum Weight : 30

Part A

*Answer any **five** questions.*
Each question has weight 1.

1. Explain indifference curve approach. What are the assumptions ?

2. State the law of diminishing marginal utility. What are its limitations ?

3. Describe the elasticity of substitution with example.

4. Describe Producer's equilibrium.

5. Describe Leontief static model

6. What are the limitations of the input-output model ?

7. Discuss the equilibrium and stability of the solution of a Linear difference equation.

8. Explain consumption model.

$(5 \times 1 = 5)$

Part B

*Answer any **five** questions.*
Each question has weight 2.

9. Show that $U = ax^2 + by^2 + c$ always has a single stationary value which is a minimum or maximum or a saddle point according as 'a' and 'b' are positive, negative or of opposite signs.

10. Explain the Lagrangian multiplier method to maximize the utility function subject to the budget constraint.

11. Prove that producer's equilibrium is obtained when the iso-cost line is tangent to the iso-product curve.

12. Explain Cobb Douglas product function. Describe any *two* applications of Cobb Douglas product function.

Turn over

13. Consider the following Cobb-Douglass production function $Y = 60K^{1/3}L^{2/3}$. Find the missing values in the table

K	L	Y
64	8	–
128	16	–
192	24	–

14. Explain Leontief's dynamic model with a real life example. Explain how matrix algebra is useful in studying this model.

15. Solve the difference equation $8y_{x+1} + 4y_x - 3 = 0$, $y_0 = 1/2$ and determine the behaviour of the solution sequence and calculate the first five values of the solution sequence.

16. Discuss the method of solving the first order linear difference equations with constant coefficients. Explain the behaviour of it's solution sequence.

$(5 \times 2 = 10)$

Part C

Answer any **three** *questions.*
Each question has weight 5.

17. (a) Explain Revealed preference theory of demand with examples.

    (b) Find the stationary values for the function $U = 2x + y - x^2 + xy - y^2$.

18. (a) Draw iso-quants for the function $f(x, y) = x^2 + y^2$.

    (b) Find the Marginal rate of technical substitution for a Cobb-Douglas production function.

19. (a) Find the marginal rate of technical substitution for the production function $f(x, y) = \sqrt{x} + \sqrt{y}$.

    (b) State and prove Euler's theorem

20. (a) Find the output for the input multiplier (A) and final demand (F) given by :

$$A = \begin{pmatrix} 0.4 & 0.6 & 0.2 \\ 0.3 & 0 & 0.1 \\ 0.3 & 0.1 & 0.2 \end{pmatrix} \text{ and } F = \begin{pmatrix} 80 \\ 60 \\ 40 \end{pmatrix}.$$

    (b) Explain input-output analysis.

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 the importance and applications of Input-Output analysis in Economics.

22. (a) Solve the difference equation $y_x + 3y_{x-1} - 2 = 0$.

(b) Explain Income-Consumption-Investment model.

$(3 \times 5 = 15)$