

C 41740

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Name.....

Reg. No.....

**FOURTH SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2023**

(CBCSS)

Econometrics

ECM 4E 05—MATHEMATICAL ECONOMICS

(2020 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Part A (Multiple Choice Questions)*Answer all questions.**Each question carries 1/5 weightage.*

1. A _____ is a monotonic transformation of a function which is homogeneous.
 - (a) Utility function.
 - (b) Slutsky equation.
 - (c) Homothetic function.
 - (d) None of the above.
2. _____ is a simplified economic model for an economy in which consumption equals production or input equals output.
 - (a) Technology co-efficient.
 - (b) Leontief closed model.
 - (c) Transaction matrix.
 - (d) Leontief Open Model.
3. The Slutsky equation :
 - (a) Provides the necessary first order conditions for the consumer's expenditure minimization problem.
 - (b) Breaks the total effect from a price change into the part due to the substitution effect and the part due to the income effect.
 - (c) Is the dual of the Lagrangian equation.
 - (d) Let's us forecast market level demand for public choice goods.
4. _____ depicts the costs or utilities associated with different pathways of the decision tree.
 - (a) Event sequence.
 - (b) Decision.
 - (c) Consequences.
 - (d) None of the above.

Turn over

5. _____ is that type of production function wherein an input can be substituted by others to a limited extent.
- (a) Translog production function.
 - (b) CES production function.
 - (c) Cobb Douglas production function.
 - (d) VES production function.
6. _____ would be a suitable approach for an optimist, or 'risk-seeking' investor, who seeks to achieve the best results if the best happens.
- (a) Maximin.
 - (b) Minimax.
 - (c) Maximax.
 - (d) All of the above.
7. _____ relates the rate of growth of possible production to the rate of investment at any time.
- (a) Decision tree.
 - (b) Slutsky equation.
 - (c) Duality function.
 - (d) Technical progress function.
8. If an imperfectly competitive firm is producing a level of output where marginal cost is equal to marginal revenue, marginal revenue is below average variable cost, and price is equal to average total cost, then the firm is :
- (a) Minimizing short-run average total cost.
 - (b) In short-run equilibrium.
 - (c) Breaking even.
 - (d) In long-run equilibrium.
9. The point $(0, 0)$ for $f(x, y) = x^3 + y^3 - 3axy$ is :
- (a) Fixed point.
 - (b) Saddle point.
 - (c) Minimum point.
 - (d) Maximum point.
10. The production function of a firm will change whenever
- (a) The firm increased its level of output.
 - (b) The firm employs more or any input.
 - (c) The relevant technology changes.
 - (d) Input price changes.

11. The Shepherd's lemma states that if indifference curves of the expenditure or cost function are convex, then the cost-minimizing point of a _____.
- (a) Good is complementary.
 - (b) Good is substitute.
 - (c) Given good with the price is unique.
 - (d) None of the above.
12. In the CES production function, if the substitution parameter approaches negative infinity, we get the _____.
- (a) Linear or perfect substitutes function.
 - (b) Cobb-Douglas production function.
 - (c) Leontief or perfect complements production function.
 - (d) All of the above.
13. In input-output analysis, there are _____ input co-efficients of production/
- (a) Linear.
 - (b) Fixed.
 - (c) Too many.
 - (d) None of the above.
14. The profit function is of :
- (a) Homogeneous of degree = 1.
 - (b) Homogeneous of degree = 2.
 - (c) Homogeneous of degree = 0.
 - (d) None of these.
15. In an input-output matrix, the principal diagonal of this matrix represents the amount of input each industry takes from _____ output.
- (a) Government sector's.
 - (b) Its own output.
 - (c) Household sector's.
 - (d) Other industry's.

(15 × 1/5 = 3 weightage)

Part B (Very Short Answer Questions)

*Answer any five questions.
Each question carries 1 weightage.*

16. What is the expenditure system ?
17. The Price elasticity of demand for a product is 1.5 and its $MR = 8$. What is its price ?
18. Define Roy's identity.
19. What is a Decision Tree ?
20. What is Neutral technical progress ?
21. Define the Constant Elasticity of Substitution Production Function.
22. What is Hawkins Simons condition for viability ?
23. What is a Dynamic Leontief system ?

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

*Answer any seven questions.
Each question carries 2 weightage.*

24. Discuss how the Homogenous utility function is derived.
25. Bring out the salient features of the Cobb- Douglas production function.
26. What is a constant elasticity model ?
27. Give an account of the Generalized Leontief cost function.
28. A perfectly competitive firm is characterized by the following.
29. Distinguish between an Open and Closed Leontief system.
30. What are the features of a Linear Expenditure System of Demand ?
31. Bring out the salient features of producer's equilibrium
32. The technology matrix of an economic system of two industries is :

$$\begin{vmatrix} 0.50 & 0.30 \\ 0.41 & 0.33 \end{vmatrix}$$

Test whether the system is viable as per the Hawkins's Simon condition.

33. The maximum values for the utility function $U = xy$ subject to constraint

$$x + y/2 = B \text{ are } \lambda^m = B, x^m = B/2, y^m = B.$$

(a) Find the maximum value function V .

(b) Deduce the minimum expenditure $E(U^*)$ of the dual problem.

(7 × 2 = 14 weightage)

Part D (Essay Questions)

Answer any two questions.

Each question carries 4 weightage.

34. Discuss in detail the salient features of Translog production function.

35. Explain in detail how the derivation of the supply function of a profit-maximizing price-taking firm can be done.

36. Determine the total demand x for industries 1, 2, 3 given the matrix of technical co-efficients A and the final demand vector B :

		Output industry				
		1	2	3		
$A =$	$\left[\begin{array}{ccc} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.3 \\ 0.3 & 0.5 & 0.2 \end{array} \right]$	1			$B =$	$\left[\begin{array}{c} 15 \\ 200 \\ 210 \end{array} \right]$
		2	Input industry			
		3				

37. State and prove the Saddle point theorem.

(2 × 4 = 8 weightage)