Integrated M.A . Programme in Social Sciences (C.S.S) EXAMINATION, NOVEMBER 2024
2021 ADMISSIONS REGULAR
SEMESTER VII - CORE COURSE ECONOMICS
EC07C32IM20 - Mathematical Economics for Advanced Studies

Time : 3 Hours   Maximum Weight : 30

Part A

I. Answer any Eight questions. Each question carries 1 weight   (8x1=8)

1. Let $U = x_1 x_2$ subject to constraint $5x_1 + 10x_2 = 200$. Find the Marshallian demand function.

2. What is the mathematical equation of Roys identity?

3. Derive TC from $Q = L^{\frac{1}{2}} K^{1/2}$ when capital is fixed at 25 ,wage is 100 and interest is 500.

4. Find MPL and APL of $Q = 50L^2 K^2$

5. At what quantity does the firm maximise profit when TR = 20 and TC = $q^2 + 40q + 20$.

6. Find the equilibrium in Bertrand model when firms price is 180-2q and MC is 20.

7. Write down the basic mathematical form of Philips curve.

8. What is the integrating factor of dy/dx + 5y =10?

9. What is the purpose of using artificial variable?

10. What are the assumptions of linear programming?

Part B

II. Answer any Six questions. Each question carries 2 weight   (6x2=12)

11. Minimize $p_1 x_1 + p_2 x_2 = M$ subject to $x_1^{\frac{1}{2}} x_2^{\frac{1}{2}}$ to find the compensated demand function.

12. Find the price, income and cross price elasticity when Q= 200- Px- 2Py +0.2M when price of x is 10, income is 1000 and price of y is 12.

13. Compare the elasticity of substitution in CD and CES production function.

14. Mathematically explain the Eulers theorem in the context of CES production function.

15. Find out the equilibrium of monopolistic competition using MR-MC and TR-TC approach when the inverse demand function is P = 85-4q with total cost of 24+13q.

16. In a perfect competitive market price is 15 and cost is $q^3/3 - 5q^2 + 28q + 25$. Find the profit maximizing and profit minimising output.

17. Mathematically derive the first order differential equation for dy/dt + ay = b in order to obtain the general solution.

18. Illustrate the Arrow Enthowen theorem.

Part C

III. Answer any Two questions. Each question carries 5 weight   (2x5=10)

19. Derive the labour-leisure choice model when $U = C^{0.5} L^{0.5}$ and given the wage as 10.

20. Derive the mathematical properties of CES production function.

21.

$$A = \begin{bmatrix} 0.2 & 0.2 & 0.2 \\ 0.3 & 0.5 & 0.2 \\ 0.2 & 0.1 & 0.3 \end{bmatrix}$$

If $A =$

Final demand is given as 1,5 and 3 respectively. Find the total output using input output analysis.

22. With the introduction of artificial variable, Minimize $z = 5x_1 + 3x_2$

Subject to $2x_1 + x_2 \geq 3$

$x_1 + x_2 \geq 2$