21P161 (Pages: 3) Name: ……..……

Reg. No: …….…....

FIRST SEMESTER M.A. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P ECO1 C04 – QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS - I

(Economics)

(2019 Admission onwards)

Time: 3 Hours Maximum: 30 Weightage

Part A

Answer ***all*** questions. Each question carries 1/5 weightage.

1. What is the integral of e^{-x} ?

   a) $-e^{-x}+c$ b) x+c c) $\frac{e^x}{2}+c$ d) none of these

2. The function of the form y = ax+b is called a ……. function

   a) linear b) logarithmic c) polynomial d) rational

3. The difference between the total amount that consumers would be willing to spend and actual consumer expenditure is called …….

   a) Consumer surplus b) producer surplus c) demand d) supply

4. Specify the degree of the differential equation $\frac{d^3y}{dx^3}+3x^2y\left(\frac{d^2y}{dx^2}\right)-2y^4=0$.

   a) 0 b) 1 c) 2 d) 3

5. The sum of first 9 natural numbers is …….

   a) 55 b) 50 c) 45 d) 53

6. A diagonal matrix in which each of the diagonal element's unity is called

   a) unit matrix b) triangular matrix c) diagonal matrix d) zero matrix

7. What is the common ratio of 18, -12, 8, ……?

   a) 2/3 b) -2/3 c) -3/2 d) 6

8. The decrease in the price or the value of the assets with time is called ……

   a) annuity b) depreciation c) interest d) sinking

9. $\lim_{x\to 0}\frac{e^x-1}{2x}=\cdots\ldots\ldots$

   a) 0 b) ½ c) e d) none of these

10. The n^{th} term of an arithmetic progression is

    a) a+(n-1)+d b) a + (n-1)d c) a + n(n-1)d d) a + nd

11. If $4x + 7y = 8$, then the value of the slope is …….

a) 4/6 b) -4/7 c) ¾ d) none of these

12. The characteristic roots of $A = \begin{bmatrix} 2 & 3 \\ 3 & 2 \end{bmatrix}$ are

a) 3,2 b) 1,-5 c) -1,5 d) none of these

13. The value of $\int_0^1 x^4 dx$ is

a) $1/5$ b) 0 c) 1 d) none of these

14. The estimated change in total utility from a unit change in the utilization of the product per unit time is termed as …….

a) marginal utility b) revenue utility c) cost utility d) price utility

15. The necessary and sufficient condition for a square matrix A to possess the inverse is …….

a) $|A| \neq 0$ b) $|A| = 0$ c) $|A| = 1$ d) none of these

(15 × 1/5 = 3 Weightage)

Part B (Very short answer questions)

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

16. Define sinking fund

17. Find the value of the determinant $\begin{vmatrix} 1 & 4 & -4 \\ 3 & -5 & 7 \\ 1 & 4 & 8 \end{vmatrix}$

18. Draw the graph of increasing function and decreasing function

19. Find ∂f/∂x for $f=2xe^x+ye^x+x^2$

20. Give an example of a singular matrix

21. If Rs. 45,000 is paid after 5 years at 10% rate of simple interest, find the principal.

22. Explain the relationship between demand, price and supply using graphs?

23. If $U = x^2 + 7xy + y^2$, then find $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$

(5 × 1 = 5 Weightage)

Part C (Short answer questions)

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

24. Explain the different types of annuities

25. A machine cost 60,000 rupees has been depreciating to 15,000 rupees in 5 years. If the depreciation is calculated on diminishing value, obtain the rate of depreciation.

26. A firm knows that the demand function for one of its products is linear. It also knows that it can sell 70 units when the price is Rs. 2 per unit and it can sell 80 units at a price of Rs 3 per unit. Find the demand function and the total revenue function.

27. Find $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} + z\frac{\partial f}{\partial z}$ if f=xy+yz+xz

28. Find $\int_a^b [e^{-3x} + 2x + x^3 + sinx]dx$

29. Discuss on average revenue and marginal revenue.

30. Identify the number of terms in the A.P. 10, 13, …, 40?

31. For $f=x^2+y^2+xy$, show that $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 4$

32. Explain the relationship between interest rates and price of bonds?

33. Solve the following system of equations by Cramer's rule:

$$x + y = 2, y + z = 4; x + z = 3.$$

(7 × 2 = 14 Weightage)

Part D (Essay questions)

Answer any ***two*** questions. Each question carries 4 weightage

34. Explain the Cobweb model. For the data given below, determine (a) the market price P_t in any time period, (b) the equilibrium price P_e and (c) the stability of the time path.

$$Q_{dt} = 180 - 0.75P_t, \qquad Q_{st} = -30 + 0.3P_{t-1}, P_0 = 220.$$

35. Find the extreme value of the production function P(x,y,z)= $2x + 3y + z$ with production capacity

C(x,y)= $x^2 + y^2 - 5$ and D(x,z)=x+z-1, using the Lagrange's method of multipliers.

36. If the demand function f(q)=30-2q and supply function g(q)=4q+6. Determine consumer's surplus and producer's surplus.

37. The cost of producing 'y' tons of steel is given by $C(y) = y^3+2y^2-5y+2$. Obtain the following.

a. Slope of the marginal cost at y=5
b. average cost
c. average variable cost
d. The value of 'y' for which marginal cost is same as average variable cost

(2 × 4 = 8 Weightage)

****