32552 (Pages : 5) Name.....

Reg. No.....

FIRST SEMESTER M.A. (CBCSS) [REGULAR/SUPPLEMENTARY] DEGREE EXAMINATION, NOVEMBER 2022

Economics

ECO 1C 04—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

(2019 Admission onwards)

me : Three Hours Maximum : 30 Weightage

Part A

Answer **all** *questions.*
Each bunch of five question carries a weightage of 1.

Iultiple Choice Questions :

1. A polynomial function of degree two is a ———.
   (a) Linear function. (b) Quadratic function.
   (c) Non-linear function. (d) None of these.
2. Inverse Function of exponential function is :
   (a) Logarithmic function. (b) Constant function.
   (c) Linear function. (d) None of these.
3. If the number of rows of a matrix is equal to the number of column is called ———.
   (a) Rectangular matrix. (b) Square matrix.
   (c) Identify matrix. (d) None of these.
4. A square matrix in which all the diagonal elements are one and the non-diagonal elements are zero is called ———.
   (a) Diagonal matrix. (b) Unit matrix.
   (c) Skew matrix. (d) None of these.
5. The derivative of a constant functions is :
   (a) 0. (b) 1.
   (c) – 1. (d) Infinity.
6. If income elasticity of demand is greater than 1, the commodity is :
   (a) Necessity. (b) Luxury.
   (c) Inferior good. (d) Non-related good.

Turn over

7. Find the total revenue function of the average revenue function $100 - x$.

(a) $100 - 2x$.

(b) $100 - x^2$.

(c) -1.

(d) $\frac{100}{x} - 1$.

8. Find the 20th term of the following sequence : 1, 4, 7, 10 ....

(a) 32.

(b) 58.

(c) 127.

(d) 356.

9. As per the NPV, any project to be acceptable should have a :

(a) Positive NPV.

(b) Zero NPV.

(c) Negative NPV.

(d) Both (a) and (b).

10. Difference equation is used in :

(a) Discrete time analysis.

(b) Continuous time analysis

(c) Digital analysis.

(d) None of these.

11. How many terms are there in GP 5, 20, 80, 320, ..., 20480.

(a) 16.

(b) 10.

(c) 6.

(d) 7.

12. If $x^2 + 2xy = y^2$, then $\frac{dy}{dx}$ is :

(a) $\frac{x+y}{y-x}$.

(b) 2x + 2y.

(c) $\frac{x+1}{y}$.

(d) $-x$.

13. While judging a project from its NPV, which one you select :

(a) Highest NPV.

(b) Lowest NPV.

(c) NPV cannot be judged.

(d) None of these.

14. The Engel curve of a secondary degree equation will be shaped as :

(a) Straight line.

(b) Parabola.

(c) Circle.

(d) Ellipse.

15. The minimum value of $f(x) = x^4 - x^2 - 2x + 6$ is :

(a) 6.

(b) 4.

(c) 8.

(d) None of these.

Part B (Very Short Answer Questions)

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

Evaluate $\lim_{x \to 4} \frac{x^2 - 2x - 8}{x - 4}$.

Find the derivative of the function for $y = \frac{x^3}{x - 2}$.

Draw graph of logarithmic function when base 'a' is greater than 1 and less than 1.

What do you mean by rank of a matrix ?

Find the second order partial derivative of the given function by using generalised power function rule :

$$Z = 2x^2 - 18xy - 6y^3.$$

Find the marginal product from the following Total Product function (TP) function :

$TP = 70 + 10Q - 4Q^2 + 4Q^3$ and evaluate it at $Q = 5$ and $Q = 8$.

Find the value of Rs. 150 at 15 percent interest for 3 years compounded annually.

Find Maxima and Minima of $y = 2x^3 - 6xy$.

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

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

What are the important properties of determinant ?

Find Total Revenue, Average Revenue and Marginal Revenue for the demand function $p = q^{\frac{1}{4}} + 32$ where 'p' is price and 'q' is the quantity demanded.

Evaluate $\int \frac{40x^3}{(20x^4 + 2)^4} dx$.

The demand function $P = 30 - 2x$. The supply function $2P = 5 + x$, find consumer's surplus.

For the data given below, determine the market price in any time period and the equilibrium price :

$Q_{dt} = 110 - 0.2P_t$, $Q_{st} = -15 + 0.3P_{t-1}$ and $P_0 = 127$.

Turn over

29. A company considering two projects A and B, each of them requires of Rs. 50 Million. The expected cash inflows (in Million) from the pr

Year	1	2	3	4
Project A	11	19	32	37
Project B	38	22	18	10

If the cost of capital is 10 percent, which project should be considere the basis of Net Present Value ?

30. Find the inverse of the following matrix :

$$A = \begin{bmatrix} 4 & 2 \\ 6 & 8 \end{bmatrix}.$$

31. Solve the differential equation $(1+x^2)\frac{dy}{dx} + (1+y^2) = 0$, given that $y =$

32. Solve the following linear equations by matrix method :

$$\begin{aligned} 2x + 3y - z &= 0 \\ x - y - 2z &= 0 \\ 3x + y + 3z &= 0. \end{aligned}$$

33. Evaluate the following integral as limit of sum : $\int_0^3 (x+4)\,dx$.

(7

Part D (Essay Questions)

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

34. Given utility function as $U = x^2 + 3xy - 5y^2$. Price of the commodity commodity y is Rs. 3 and consumer's money income is Rs. 6. Find the consumption of commodities x and y and also prove the conditions for

35. A firm has the Total Cost function $C = \frac{1}{3}Q^2 - 7Q^2 + 111Q + 50$ and $Q = 100 - P$. Find output that maximises profit. What is the maximum pro Average Revenue and Marginal Revenue, Total Cost, Average Cost and

6. Solve the system of equations using Cramer's rule :

$$\begin{aligned} 5x - 7y + z &= 11 \\ 6x - 8y - z &= 15 \\ 3x + 2y - 6z &= 7. \end{aligned}$$

37. Explain the Economic applications of differential calculus.

(2 × 4 = 8 weightag