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(Pages : 3)

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FIRST SEMESTER M.A./M.Sc./M.Com. DEGREE EXAMINATION
DECEMBER 2019

(CBCSS)

Economics

ECO 1C 04—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I
(2019 Admissions)

Maximum : 30 Weightage

Time : Three Hours

Part A (Short Answer Type Questions)

Answer any four questions.

Each question carries a weightage of 2.

1. Distinguish between linear and quadratic functions with example.

2. Explain characteristic equation and characteristic roots.

3. Find the value of $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x^2 - 9}$.

4. Find $\frac{dy}{dx}$ if $y = (x^3 + 1)(1 + x)$.

5. Give the conditions for maximum and minimum of a function. Find the maximum and minimum values of $y = x^3 - 6x^2 + 9x - 5$.

6. Define a differential equation. What do you mean by order and degree of a differential equation?

Solve $\frac{dy}{dx} = y + 1$.

7. Find the compound interest on Rs. 1,000 at 10 % per annum for $1\frac{1}{2}$ years when interest is accumulated every 6 months?

(4 × 2 = 8 weightage)

Turn over

Part B (Paragraph Type Questions)*Answer any four questions.**Each question carries a weightage of 3.*

8. Explain the properties of a determinant.

9. Solve the following equations $2x + 3y = 1$ and $3x + y = 5$ using Cramer's rule.10. Find the rank of $A = \begin{bmatrix} 1 & 2 & 0 & 5 \\ 3 & 1 & 2 & 2 \\ 2 & 4 & 0 & 10 \end{bmatrix}$.11. The total cost function of a firm is $C = \frac{1}{3}x^3 - 5x^2 + 28x + 10$ where C is the total cost and x is the output. A tax at the rate of Rs. 2 per unit of output is imposed and the producer adds it to his cost. If the market demand function is given $p = 2530 - 5x$ where p is the price per unit of output. Find the profit maximizing output and price.12. Explain the optimization techniques using Lagrangian multiplier method. Maximize the utility function $U = 4xy - y^2$ maximizing subject to the constraint $2x + y - 6 = 0$.13. If $z = \frac{x^2y^2}{x+y}$, show that $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 3z$.

14. Find the difference between compound interest and simple interest for 2 years on a sum of Rs. 1,800 at 4% per annum.

(4 × 3 = 12 weightage)

Part C (Essay Type Questions)*Answer any two questions.**Each question carries a weightage of 5.*

15. Solve the following equations using matrix inversion method :

$$5x - 6y + 4z = 15$$

$$7x + 4y - 3z = 19$$

$$2x + y + 6z = 46.$$

The
best
method

- ~~16~~ Define the derivative of a function. Explain the rules of differentiation. Discuss the applications of derivatives in Economics. Find the elasticity of demand for the demand function $x = \frac{27}{p^3}$.
17. Define integration. What do you mean by integration by parts? Show that the area bounded by the curve $y = \frac{4}{x^2} + x^3$, the x -axis and the ordinates $x = 2$ and $x = 4$ is 61 square units.
18. Define consumer's surplus and producer's surplus. The demand function for a commodity is $p = 80 - 4x - x^2$. Find the consumer's surplus when (i) $p = 20$; and (ii) $p = 35$.

(2 × 5 = 10 weightage)