

B.A. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Fourth Semester

Economics — Core

BASIC MATHEMATICS FOR ECONOMICS — II

(For those who joined in July 2020 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- If $y = 10x^{12}$, find dy/dx
 - $120x^{11}$
 - $120x^{12}$
 - $120x^{13}$
 - $120x^{10}$
- If $y = 7$, find dy/dx
 - 0
 - 7
 - 5
 - 11
- Who invented the theory of matrices?
 - Cayley
 - Adam Smith
 - Keynes
 - Marshall
- An array of numbers in rectangular brackets is called _____
 - Matrix
 - Set theory
 - Logarithmic
 - Differentiation
- Who first propounded input - output analysis?
 - Wassily W. Leontief
 - Adam Smith
 - Keynes
 - Marshall
- Input - output analysis is used to study the _____
 - Inter - industry relations
 - Relations
 - Industry
 - Independent industry

- Find the $\partial u/\partial x$ and $\partial u/\partial y$ for the functions :
 $u = xy$
 - $\partial u/\partial x = y$ and $\partial u/\partial y = x$
 - $\partial u/\partial x = y^2$ and $\partial u/\partial y = x^2$
 - $\partial u/\partial x = y^3$ and $\partial u/\partial y = x^3$
 - $\partial u/\partial x = 2y$ and $\partial u/\partial y = 3x$
- Find out $\frac{\partial Q}{\partial L}$ and $\frac{\partial Q}{\partial K}$ for the production function
 $Q = 24KL - 10L^2 - 8K^2$
 - $\partial Q/\partial L = 24K - 20L$ and $\partial Q/\partial K = 24L - 16K$
 - $\partial Q/\partial L = 4K$ and $\partial Q/\partial K = 4L - 40L^4$
 - $\partial Q/\partial L = 2K$ and $\partial Q/\partial K = 2L - 24K^2$
 - $\partial Q/\partial L = K$ and $\partial Q/\partial K = L^4$
- Calculate $\int 7dx$
 - $7x + C$
 - 7
 - x
 - $x + C$
- Find $\int x^7 dx$
 - $\frac{x^8}{8} - c$
 - 8
 - x
 - $x + C$

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

- (a) If $y = (x^4 + x^3)(x^2 + x)$ find dy/dx .
Or
(b) If $y = 5x^4 + 2x^3$, find dy/dx , d^2y/dx^2 and d^3y/dx^3 .
- (a) Find the total differentiation of
 $u = 4x^2 + 3y^2$.
Or
(b) For $u = x^3 + y^2$, find all the partial derivatives.
- (a) Find $\int (x^3 - x + 1)dx$.
Or
(b) Evaluate $\int_1^2 (x^3 - 2x - 3)dx$.
- (a) If $A = \begin{pmatrix} 2 & 1 \\ 3 & 0 \\ 5 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 0 \\ 3 & 8 \end{pmatrix}$ find AB .

Or

- (b) Verify whether $AB = BA$ for the matrices

$$A = \begin{pmatrix} 2 & 1 & 0 \\ 1 & -1 & 2 \\ 0 & 1 & 3 \end{pmatrix} \text{ and } B = \begin{pmatrix} 1 & 2 & -1 \\ -2 & 0 & 1 \\ 1 & 1 & 2 \end{pmatrix}.$$

15. (a) Write basic concepts of input - output analysis.

Or

- (b) Explain the assumptions of input - output analysis.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Find the maxima or minima of the function $y = x^2 - 4x - 5$.

Or

- (b) Find the Elasticity of demand and marginal revenue (MR), at $P=2$ if the demand function $q = 30 - 5p - p^2$.

17. (a) Find the maxima or minima of the function $z = 10x + 20y - x^2 - y^2$.

Or

Page 5 Code No. : 10390 E

- (b) Prove $x(\partial u/\partial x) + y(\partial u/\partial y) + z(\partial u/\partial z) = 3u$ for the function $u = x^3 + y^3 + z^3 - 3xyz$ by using Euler's theorem.

18. (a) Compute total cost for the marginal cost function $C = 2 + 6x - 4x^2$, if total fixed cost is 50.

Or

- (b) If the demand function is $P = 25 - 3x - 3x^2$ and the demand (x_0) is 2, what will be the consumer's surplus?

19. (a) Explain the types of matrices.

Or

- (b) Find the inverse of the matrix $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$.

20. (a) Explain the importance of input - output analysis.

Or

- (b) Explain the limitations of input - output analysis.

Page 6 Code No. : 10390 E