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Reg. No. :

Code No. : 30599 E Sub. Code : CMEC 41

B.A. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Economics – Core

MATHEMATICS FOR ECONOMICS – II

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. If A is a square matrix such that $A^2 = A$, then $(1 - A)^3 + A$ is equal to
 - (a) 1
 - (b) 0
 - (c) $1 - A$
 - (d) $1 + A$
2. Total number of possible matrices of order 3×3 with each entry 2 or 0 is
 - (a) 9
 - (b) 27
 - (c) 81
 - (d) 512

3. Technical relationship between input and output is called

- (a) elasticity
- (b) production function
- (c) input function
- (d) none of the above

4. The value of y when $\frac{dy}{dt} = y^2 t$ is

- | | |
|----------------------|------------------------|
| (a) $\frac{2}{t+c}$ | (b) $\frac{1}{t^2+c}$ |
| (c) $\frac{-2}{t+c}$ | (d) $\frac{-2}{t^2+c}$ |

5. What is the order of differential equation $\frac{dy}{dx} = 10x + 5$

- | | |
|-----------|------------|
| (a) first | (b) second |
| (c) third | (d) fourth |

6. When the total product is maximum, marginal product will be

- | | |
|-------------|--------------|
| (a) minimum | (b) maximum |
| (c) zero | (d) negative |

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7. $TR - TC$ is also known as
 (a) Revenue (b) Profit
 (c) Cost (d) None of the above
8. When $e^x = 1$, the value of x is
 (a) 0 (b) -1
 (c) 1 (d) cannot say
9. The process of determining present value of a future sum of money is
 (a) compounding (b) discounting
 (c) adding up (d) transfer
10. Euler's theorem is valid only for _____ function.
 (a) non linear (b) linear
 (c) quadratic (d) exponential

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define matrix inversion techniques.

Or

- (b) Find the rank of the 2×2 matrix

$$B = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$$

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12. (a) Explain the limitations of input-output analysis.

Or

- (b) In a two sector economy, the income function is $y = c + I$ and consumption function is given as $c = 40 + 0.75y$ of investments are 60 crores. Calculate equilibrium level of income.

13. (a) Differentiate $x^2(x-3)$.

Or

- (b) Differentiate $(\sqrt[3]{x})^4$.

14. (a) Find the partial derivatives of $x = 4x^2 + 4xy + y^2$.

Or

- (b) $z = x^3 e^{2y}$ find partial derivatives.

15. (a) Explain the properties of simple integration.

Or

- (b) What is the definition of simple integration?

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[P.T.O.]



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 rank of Matrix A by using the row Echelon form

$$A = \begin{vmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 3 & 0 & 5 \end{vmatrix}$$

Or

(b) $A = \begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \\ 4 & 7 & 6 \end{vmatrix}$ $B = \begin{vmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{vmatrix}$ Find AB .

17. (a) In a two sector, economy the income function is $y = c + I$ and consumption function is given as : $c = 40 + 0.75y$, if investments are 60 crores. Calculate the level of consumption expenditure.

Or

- (b) Explain the input-output analysis with two sector model.

18. (a) Given function is $U = 5x - 6y + 8$ to find partial derivatives.

Or

- (b) If you deposited Rs.55,650 in a bank, which was paying a 15 percent rate of interest on a ten year time deposit, how much would the deposit grow at the end of ten years?

19. (a) The marginal cost function for some product is $(1 + x + 6x^2)$ where x is the output. Find the total cost function if the fixed cost is Rs.100 when the output is zero.

Or

- (b) The marginal cost function of a firm is $2 + 3e^x$ where x is the output. Find the total cost and average cost functions if the fixed cost is Rs.500.

20. (a) Calculate consumer surplus if the demand function $p = 50 - 2x$ and $x = 20$.

Or

- (b) List out the important steps in evaluating a definite integration.

