(6 pages) Reg. No. : .....

Code No. : 22970 E **Sub. Code : SMEC 41**

B.A. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Fourth Semester

Economics — Main

MATHEMATICAL METHODS — II

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. If $m = 2$ and $c = 3$ then equation of straight line

(a) $y = 3x + 2$ (b) $y = 3x - 2$

(c) $y = 2x + 3$ (d) $y = 2x - 3$

2. If $y = \cos x, \frac{dy}{dx} =$ _____.

(a) $\cos x$ (b) $\sin x$

(c) $-\cos x$ (d) $-\sin x$

3. If $y = e^{2x}$ $\frac{dy}{dx} =$

(a) 2 (b) 0

(c) e^{2x} (d) $2e^{2x}$

4. For maximise a function second order condition is equal to

(a) Zero (b) One

(c) Less than zero (d) Greater than zero

5. If $u = \frac{x}{y}, \frac{\partial u}{\partial y} =$ _____.

(a) $\frac{1}{y}$ (b) $\frac{1}{x}$

(c) x (d) $-\frac{x}{y^2}$

6. If $u = e^x e^y, \frac{\partial u}{\partial y} =$

(a) ex^2y^2 (b) $\frac{e^y}{e^x}$

(c) $\frac{e^x}{e^y}$ (d) $e^x e^y$

7. Find the value of the determinant $\begin{vmatrix} 2 & -1 \\ -4 & 2 \end{vmatrix}$

(a) 8 (b) 0

(c) 2 (d) 4

8. Find the rank of $A = \begin{bmatrix} -3 & 4 \\ 2 & 3 \end{bmatrix}$.

(a) 0 (b) 1

(c) 2 (d) -1

9. $\int x^n dx =$

(a) $x^{n+1}/n+1^{+c}$

(b) x^{n+1}

(c) $(x^{n+1})(n+1)$

(d) 1

10. Find the value of the determinant $\begin{vmatrix} 0 & 0 \\ 1 & 0 \end{vmatrix}$

(a) -1 (b) 0

(c) 1 (d) 2

PART B — ($5 \times 5 = 25$ marks)

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

Answer should not exceed 250 words.

11. (a) Find $\frac{dy}{dx}$ for $y = x^5 + 4x^4 + 8x + 2$.

Or

(b) Find the second order derivative of $y = (x-1)(2x+1)$.

12. (a) Find $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$ for

$$U = 2a^2xy - 3ax^2y - ay^3 + x^3y + xy^3.$$

Or

(b) Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}, \frac{\partial^2 z}{\partial x^2}, \frac{\partial^2 z}{\partial y^2}, \frac{\partial^2 z}{\partial x \partial y}, \frac{\partial^2 z}{\partial y \partial x}$ for the function $z = xy$.

13. (a) Find $\int 3x^2 + 9x + 10$.

Or

(b) Find the value of $\int_x^h (y - 19)\, dy$.

14. (a) If $A=\begin{pmatrix}8 & 5 & 2\\ 1 & -3 & 2\end{pmatrix}$. Find A^T and $(A^T)^T$.

Or

(b) If $\begin{bmatrix}5x+2 & y-4\\ 0 & 4x+6\end{bmatrix}=\begin{bmatrix}12 & -8\\ 0 & 2\end{bmatrix}$. Find the value of x, y and z.

15. (a) If $A=\begin{bmatrix}1 & 2 & 3\\ 3 & 2 & 1\\ 1 & 1 & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 3\\ 2 & 2\\ 3 & 1\end{bmatrix}$ find AB.

Or

(b) Explain the properties of matrix multiplicative.

PART C — ($5 \times 8 = 40$ marks)

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

Answer should not exceed 600 words.

16. (a) Find $\int 5x^2+2x-10$.

Or

(b) Find the value of $\int_2^3 (x-10)\,dx$.

17. (a) Determine the maxima and minima of the function $y=x^3-2x^2+x+4$.

Or

(b) Find the total differentiation of $z=(x^2y)$.

18. (a) Find the first order derivative of $y=\dfrac{1-x^2}{1+x^2}$.

Or

(b) Find the first and second order derivatives of $y=\sqrt{\dfrac{x-1}{x+1}}$.

19. (a) Find $\int (2x-5)(36+4x)\,dx$.

Or

(b) If the demand function is $p=8-2x$ and the supply function is $p=2+x$, what will be the consumer surplus?

20. (a) Using inverse matrix method, solve the following equations of : $2x-y+3z=9$, $x+y+z=6, x-y+z=2$. Find x, y, z.

Or

(b) Calculate inverse of the matrix $A=\begin{bmatrix}4 & 0 & 2\\ 2 & 10 & 2\\ 3 & 9 & 1\end{bmatrix}$.