SEAT No._____ No. of Printed Pages : 4

[4]

Sardar Patel University

S.Y.B.A. (Advanced) – Semester III (CBCS) (REG. / NC)

UA03CEEC21- Mathematical Techniques in Economics

Date: 5th January -2021 **Total Marks: 60**

Time: 10.00 to 12.00 Hours

Q. – 1 Answer the following: (Marks 20)

1) If $f(x) = x^2 - 3x - 5$, then $f(3) = ?$

   a. -3 b. -5

   c. 3d. 5

2) Matrix [1 -2 3] is called:

   a. Column Matrix b. Row Matrix

   c. Diagonal Matrix d. None

3) The equation: $3x - 5y$, is called Quadratic Equation

   a. True b. False

4) LPP means:

   a. Linear Program Problem

   b. Linear Programming Problem

   c. Line Programming Problem

   d. Line Program Problem

5) $\ln e = ?$

   a. 1 b. – 1

   c. 0 d. None

6) To do Matrix Multiplication, which of the following condition should be satisfied?

   Consider:

   Numbers of rows in First Matrix = r1

   Numbers of columns in First Matrix = c1

   Numbers of rows in Second Matrix = r2

   Numbers of columns in Second Matrix = c2

   a. r1 = r2 b. c1 = c2

   c. r1 = c1 d. c1 = r2

7) Equation System can be solved using Cramer's Rule:

   a. True b. False

(P.T.O)

8) Limitations of LPP Graphical Method is:

a. Graphical Method can solve LPP having only one variable
b. Graphical Method can solve LPP having minimum one variables
c. Graphical Method can solve LPP having maximum two variables
d. None of the above

9) Write example of 3 x 3 Identity Matrix.

10) If $3x - 5 = 0$ is called:

a. Linear Equation b. Non-Linear Equation
c. Quadratic Equation d. None

11) If $x = a^n$ then $\log_a x = ?$

a. x b. a
c. n d. None

12) $\log (x*y) = \log x + \log y$

a. True b. False

13) $\log_a a = ?$

a. 0 b. 1
c. ad. None

14) If $(f * g)' = (f' * g) + (f * g')$ is called:

a. Product Rule b. Quotient Rule
c. Chain Rule d. None

15) $\frac{d}{dx}x = ?$

a. 0 b. 1
c. xd. None

16) TC=TVC+_____

a. TNC b. TFC
c. TRd. None

17) Marginal Cost Curve is _____ shaped

a. 'U' b. 'L'
c. hockey stickd. Saucer

18) Marginal Cost is the cost of _____

a. producing additional unit of output b. selling additional unit of output
c. procuring additional unit of output d. All of these

19) Long run average cost curve is _____ shaped.

a. 'U' b. 'L'

c. Saucer d. All of these

20) Marginal cost cure always cuts average cost curve at its _____ point.

a. Highest b. Minimum

c. Both a and b d. None of these

Q. – 2 Theoretically an LAC is 'U' shaped but practically it is 'L' shaped – Explain. **(Marks 15)**

OR

Q. – 2 Consider following matrices: **(Marks 15)**

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

Calculate: 1) A * B

2) B * A

And verify that: A * B = B * A

Q. – 3 Attempt any five **(Marks 25)**

a. Define with example: Identity Matrix, Square Matrix

b. Do second order derivation of:

1. $f(x) = (5x^3 + 3x^{10})(x^2+1)$

c.Consider following matrices:

$$A = \begin{pmatrix} 1 & 2 & -1 \\ 0 & -2 & 3 \\ 1 & 5 & 0 \end{pmatrix} \quad B = \begin{pmatrix} -1 & 3 & 0 \\ 1 & 2 & -3 \\ 0 & -5 & 7 \end{pmatrix}$$

Calculate: 2*A – 3*B

d. Solve using Cramer's Rule:

$x + 2y + 3z = -5$

(3)

(P.T.O)

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

e. A ball is thrown in the air. Its height at any time t is given by:

$h = 3 + 14 * t - 5 * t^2$

What is its maximum height?

f. Write a note on Marginal cost curve.
g. Explain the relationship between TC, TFC and TVC.
h. Write a note on Saucer shaped LAC
i. What do you understand by Economies of scale.
j. Derive LAC with the help of SACs.