

(6)

- (d) Find all the partials derivatives of second-order and cross-partial derivatives of the function below :

$$U = 2x^2 + 4xy + 5y^2$$

- (e) Solve the following equations by using Cramer's rule :

$$2x_1 + 3x_2 = 13$$

$$x_1 + 7x_2 = 23$$

- (f) If

$$A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}, B = [1 \ 3 \ -6]$$

verify that $(AB)^1 = B^1A^1$.

Total No. of Questions : 4]

[Total No. of Printed Pages : 6

Course Code

BEC - 02

Term End Examination – December, 2019

MATHEMATICAL METHODS FOR
ECONOMICS-I

Bachelor of Arts (Honours) in Economics
(BAEC)

Time : 3 hours

Full Marks : 100

The figures in the right-hand margin indicate marks

Answer **all** Groups as directed

Group—A

1. Answer *all* the questions, each within 1 word : 1×10=10

(a) Which set will come with the union of Set A and its complement A^1 ?

(b) The set of all first elements of ordered pairs which belong to the relation is called _____.

(c) A zero degree polynomial function is called a _____ function.

(2)

(d) What is the value of the standard limit, where $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \text{_____}$.

(e) If $y = e^x$, then

$$\frac{dy}{dx} = \text{_____}.$$

(f) From the following total cost, which is the Total Fixed Cost (TFC) ?

$$C = Q^3 + 3Q^2 + 15Q + 20$$

(g) What is the relationship of elasticity demand with $\frac{AR - MR}{AR}$?

(h) If $u = f(x, y)$ is a homogenous function of degree n , the following relation holds good on which theorem?—

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = nu$$

(i) Any matrix in which the number of rows is equal to the number of columns is called _____ matrix.

(j) If A and B are non-singular matrices of order $n \times n$, then $(AB)^{-1} = \text{_____}$.

(5)

(h) If $y = 7x^7 - 8x^8$, then find $\frac{dy}{dx}$.

(i) If $z = x^3 e^{2y}$, then find partial derivatives.

(j) Differentiate between null matrix and unit matrix.

(k) Write two properties of a determinant.

(l) Explain minors and co-factors of a matrix.

Group—D

4. Answer *any four* questions each should be within 500 words : 10×4=40

(a) Evaluate :

$$\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 - 1}$$

(b) Show that

$$\frac{x^2 + 1}{x^2 - 1}$$

is discontinuous at $x = 1$.

(c) Find $\frac{dy}{dx}$ if $y = \sqrt{1 + x^2}$.

(3)

Group—B

2. Answer *any ten* questions each should be within 2 sentences : $2 \times 10 = 20$

- (a) Define equal set with an example.
- (b) What is symmetric relation?
- (c) Write the addition theorem on limits.
- (d) Define natural logarithms in differentiation with an example.
- (e) If $f'(x) > 0$, $f''(x) > 0$, then write the slope of the curve.
- (f) Write any two relations between AC and MC.
- (g) Write the formula of a saddle point by using partial derivatives.
- (h) Find $\frac{\partial z}{\partial x}$ partial derivative if $Z = x^2 + 4xy + y^2$.
- (i) If $u = 2x^2 + 3y^2$, then find f_{xy} of the problem.
- (j) Give an example of a diagonal matrix.

(4)

Group—C

(k) When two matrices A and B are conformable for multiplication?

(l) What is the rank of a matrix?

3. Answer *any ten* questions each should be within 75 words : $3 \times 10 = 30$

- (a) Explain set builder form of a relation with example.
- (b) Draw the graphical presentation of an exponential function.
- (c) Find the limit of

$$\frac{x^2 - 9}{x + 3}$$

when $x \rightarrow 3$.

- (d) Write the characteristics of continuity of a function.
- (e) If $TC = C = Q^3 - 3Q^2 + 15Q$, then find MC and AVC.
- (f) Write the formula of AR, MR and elasticity of demand.
- (g) Find the marginal utility function of x and y for the total utility function $U = 2xy^2 + 3x^3y - 2x + 7y$.