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(Pages : 3)

Name.....

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Reg. No.....

**FIRST SEMESTER M.A. DEGREE EXAMINATION, FEBRUARY 2013**

(CUCSS)

Economics

**Paper III—QUANTITATIVE TECHNIQUES—1**

(2010 admissions)

Time : Three Hours

Maximum : 36 Weightage

**Part A**

Answer all questions.

Each bunch of four questions carries weightage 1.

**A. Multiple Choice Questions :**

1 Gradient of a line joining points (2, 5) and (4, 13) is :

- (a) 2. (b) -2.  
(c) 4. (d) -4.

2 When function  $Y = 2x^2 + 3$  is differentiated from first principle,  $\frac{\Delta y}{\Delta x}$  is :

- (a)  $4x^2$ . (b)  $4x + 2\Delta x$ .  
(c)  $4x^2 + 2\Delta x$ . (d)  $\frac{4x^2}{2\Delta x}$ .

3 If  $y = \frac{1}{x^2}$ ,  $\frac{dy}{dx}$  is :

- (a)  $\frac{-2}{x^2}$ . (b)  $\frac{-2}{x^2}$ .  
(c)  $\frac{-2}{x^3}$ . (d)  $\frac{-2}{x^3}$ .

4 Determinant of a matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 5 \\ 1 & 2 & 3 \end{bmatrix}$  is :

- (a) 0. (b) 1.  
(c) 2. (d) 5.

Turn over



## B. Multiple Choice Questions :

5 Let A and B be two matrices. If  $AB = BA = I$ , then B is called :

- (a) Cofactor of A. (b) Inverse of A.  
(c) Minor of A. (d) Adjoint of A.

6 For a straight line, Y-intercept is the point where :

- (a)  $y = 0$ . (b)  $x = 0$ .  
(c)  $y = x^2$ . (d)  $x = y^2$ .

7  $x^{-\frac{2}{3}} =$

- (a)  $\frac{1}{(x^{\frac{1}{3}})^2}$ . (b)  $\frac{1}{(x^{\frac{2}{3}})^2}$ .  
(c)  $\frac{-2}{x^{\frac{1}{3}}}$ . (d)  $\frac{1}{x^{\frac{3}{2}}}$ .

8 A negatively sloped line moves :

- (a) Upward. (b) Downward.  
(c) Horizontally. (d) Vertically.

## C. Fill in the blanks :

9 Given a supply function  $Q_s = -5 + 3p$  and a demand function  $Q_d = 10 - 2p$ , equilibrium is \_\_\_\_\_.

10 The slope indicates the \_\_\_\_\_ and \_\_\_\_\_ of a line.

11 In the income determination model  $Y = C_0 + bY_0 + I_0$ ,  $b$  is called the \_\_\_\_\_.

12 The joint occurrence of two or more simple events is called a \_\_\_\_\_ event.

## D. State True or False :

13  ${}^n C_r$  is always equal to  ${}^n C_{n-r}$ .

14 A difference equation is homogeneous if there is a constant term in the equation.

15 For a demand function :

$$Q = 150 - 15P, \text{ when } P = 4 \text{ elasticity is } \frac{2}{3}.$$

16 All indifference curves are convex to the origin.

(16 × ¼ = 4 weigh

## Part B

Answer any ten questions, each not exceeding one page.  
Each bunch of four questions carries weightage 1.

17 Find the point of inflexion for the curve :

$$Y = x^3 - 3x^2 + 3x + 2.$$



18 What is partial differentiation ? Write the partial derivatives of :

(a)  $Y = x^2 + 3xz - 4z^2$ .

(b)  $Y = w^3 + w^2x + x^2z - z^2$

19 What are the different types of matrices ?

20 What is meant by rank of a matrix ? Find the rank of matrix  $A = \begin{bmatrix} 2 & 5 & 1 \\ 3 & 2 & 4 \\ 1 & 4 & 2 \end{bmatrix}$ .

21 Solve the following system of equations using Cramer's rule :

$$6x_1 + 5x_2 = 49$$

$$3x_1 + 4x_2 = 32$$

22 Find the inverse of matrix :

$$A = \begin{bmatrix} 7 & 9 \\ 6 & 12 \end{bmatrix}.$$

23 What is a characteristic function ? Find the characteristic roots of matrix :

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}.$$

24 What is meant by economic optimisation ? Optimise the function  $f(x) = 2x^3 - 30x^2 + 126x + 59$ .

25 State and prove the commutative property of matrix multiplication.

26 What is implicit differentiation ? Use implicit differentiation to find the derivative of the equation  $4x^2 - y^3 = 97$ .

27 What is a random variable ? Explain a probability distribution function.

28 What do you mean by a binomial distribution ? For a random sample from binomial distribution

mean  $\bar{x} = 4$ , variance  $= \frac{12}{9}$ . Find  $n, p$  and  $q$ .

(10 × 3.2 = 32 weightage)