

FIRST SEMESTER M.A. DEGREE EXAMINATION, DECEMBER 2016

(CUCSS)

Economics

ECO 1C 03—QUANTITATIVE TECHNIQUES

(2010 Admissions)

Maximum : 36 Weightage

Part A

Answer all questions.

Each bunch of four questions carries a weightage of 1.

A. Multiple choice questions :

1. The value of ${}^{10}C_0$ is :

- | | |
|-----------|-------------|
| (a) Zero. | (b) Ten. |
| (c) One. | (d) Twenty. |

2. $P(A \cup B) = P(A) + P(B)$, if :

- | | |
|---------------------------|-------------------------|
| (a) A and B are disjoint. | (b) A is a subset of B. |
| (c) B is a subset of A. | (d) None of these. |

3. The total number of possible outcomes in any trial is known as :

- | | |
|--------------------------------|------------------------|
| (a) Mutually exclusive events. | (b) Exhaustive events. |
| (c) Independent events. | (d) Random Variable. |

4. A matrix in which every element is zero is called :

- | | |
|--------------------|-----------------------|
| (a) Zero matrix. | (b) Null matrix. |
| (c) Square matrix. | (d) Both (a) and (b). |

B. Multiple choice questions :

5. The rank of a null matrix is :

- | | |
|---------------|--------------|
| (a) Zero. | (b) One. |
| (c) Infinity. | (d) Unknown. |

6. A square matrix A is said to be symmetric if :

- | | |
|---------------------|-----------------|
| (a) $A^T = -A$. | (b) $A^T = A$. |
| (c) $(A^T)^2 = 0$. | (d) $ A = A$. |

7 Probability of an event lies between :

(a) 0 and 1.

(c) -1 and 1.

(b) -1 and 0.

(d) 1 and 2.

8 If A and B are two mutually exclusive events then $P(A \cup B)$ is equal to :

(a) $P(A) + P(B)$.

(c) $P(A/B) + P(B)$.

(b) $P(A) + P(B) - P(A \cap B)$.

(d) $P(B/A) + P(A)$.

C. Fill in the blanks :

9 The frequency ratio denotes _____.

10 Interchanging the rows and columns of a matrix is called _____.

11 If the two rows (columns) of a determinant are identical, then the value is _____.

12 The co-factor of an element is obtained by _____.

D. True or False :

13 A square matrix is said to singular if its determinant value is zero.

14 A diagonal matrix is a square matrix.

15 A random experiment is repeatable.

16 If x and y are independent, then $E(x, y) = E(x) \cdot E(y) - E(x \cap y)$.

(16 x 2 =

Part B (Short Answer Questions)

Answer any ten not exceeding one page each.

Each question carries a weight of 2.

17 Define singular and non-singular matrices.

18 Explain Slutsky equation.

19 Discuss the axiomatic approaches to probability.

20 Explain the production function with least cost combinations.

21 If $y = 3x^4 - 2x^3 + 6x$, find $\frac{d^3y}{dx^3}$.

22 With usual notations, prove that $MR = AR(1 - 1/[\eta])$, where $[\eta]$ is the elasticity.

23 If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$, $B = \begin{pmatrix} -1 & -2 \\ 0 & 4 \\ 3 & 1 \end{pmatrix}$, find the matrix X such that $A + B - X = 0$.

24 Integrate :

$$(a) \frac{x+12}{x^2-13x+42} dx ; (b) \int (ax^2+bx+c)^3 (2ax+b) dx.$$

25 Discuss the classical definition of probability.

26 A speak truth in 60% cases and B in 70% cases. In what percentage of cases are they likely to contradict each other in stating the same fact.

27 A bag contains 2 white and 3 black balls. Another contains 3 white and 2 black balls. A ball is drawn from one of the bags and found to be white. What is the probability that it is from the first bag.

28 Explain idempotent and nilpotent matrices.

(10 × 2 = 20 weightage)

Part C (Essay Questions)

Answer any **three** not exceeding **three** pages each.

Each question carries a weight of 4.

29 Discuss the properties of determinants.

30 Explain the applications of differential in Economics.

31 Find the Moment Generating Function of X whose $f(x) = \frac{e^{-m} m^x}{x!}$ for $x = 0, 1, 2, \dots$

32 If it rains, a taxi driver can earn Rs. 100 per day. If it is fair, he can lose Rs. 10 per day. If the expectation of rain is 0.4, what is his expectation ?

33 Find the inverse of $A = \begin{pmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{pmatrix}$ and verify that $A \times A^{-1} = I$.

(3 × 4 = 12 weightage)