

THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2016

(CUCBCSS—UG)

Core Course—Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

Answer all questions.
Each question carries $\frac{1}{2}$ mark.

1. $[4x^6]^{\frac{1}{2}} - 16 = 0$, the value of x is _____.
(i) 6. (ii) 2.
(iii) 3. (iv) 1.
2. For a matrix A , $A^T = A$, the matrix is, _____ matrix.
(i) Symmetric. (ii) Skewsymmetric.
(iii) Orthogonal. (iv) Identity.
3. $\log_a b \times \log_b a =$ _____.
(i) 0. (ii) 1.
(iii) $\log a - \log b$. (iv) None of these.
4. The order of a matrix A is $m \times n$, that of B is $n \times q$ then the order of AB is _____.
(i) $n \times n$. (ii) $m \times n$.
(iii) $m \times q$. (iv) $n \times q$.
5. When $TR = 100 - x^2$, the MR is _____.
(i) 100. (ii) $-2x$.
(iii) $-x^2$. (iv) None of these.
6. Which of the following is a positional average ?
(i) Harmonic mean. (ii) Geometric mean.
(iii) Median. (iv) None of these.

Turn over

7. The presence of extreme observations affects _____.

(i) Arithmetic mean.

(ii) Mode.

(iii) Median.

(iv) None of these.

8. For a set of N observations, median class is the class in which _____ observation is lying?

(i) $\left(\frac{N}{4}\right)^{th}$.

(ii) $\left(\frac{N}{2}\right)^{th}$.

(iii) $\left(\frac{3N}{4}\right)^{th}$.

(iv) None of these.

9. Quartile deviation is _____.

(i) $\frac{Q_3 + Q_1}{2}$.

(ii) $\frac{Q_3 - Q_1}{2}$.

(iii) $\frac{Q_3 - Q_1}{Q_2}$.

(iv) $\frac{Q_3 + Q_1}{Q_2}$.

10. Mean of a symmetric distribution is 8. The mode is _____.

(i) 8.

(ii) 4.

(iii) 2.

(iv) 0.

11. If X and Y are perfectly obeys the equation $2x + 5y - 2 = 0$, the correlation between X and Y is _____.

(i) +1.

(ii) -1.

(iii) 0.

(iv) None of these.

12. The regression coefficient of y on x is _____.

(i) $\frac{\text{Cov}(X, Y)}{\text{SD}(Y)}$.

(ii) $\frac{\text{Cov}(X, Y)}{\text{SD}(X)}$.

(iii) $\frac{\text{Cov}(X, Y)}{V(Y)}$.

(iv) None of these.

(12 × ½ = 6 marks)

Section B (Short Answer Type)*Answer any ten questions.**Each one carries 2 marks.*

13. Find the value of $\left[\frac{1}{25}\right]^{-\frac{3}{2}}$.

14. Define rational number.

15. State the product rule and quotient rule on logarithm.

16. Define limit of a function.

17. Define orthogonal matrix.

18. If the matrix $A = \begin{bmatrix} 4 & 2 \\ 0 & 5 \end{bmatrix}$. Find A^2 .

19. If $A = \begin{bmatrix} -3 & 4 & 2 \\ 7 & 0 & 5 \\ 6 & -4 & -1 \end{bmatrix}$, find $|A|$.

20. Define harmonic mean.

21. Find the marginal cost and average cost if the total cost is $1000 + 100x - 10x^2 + x^3$.

22. Total revenue function of a firm is $R = 21x - x^2$. Find the marginal revenue when 10 units are sold.

23. Test whether $f(x) = 2x^2 - 8x + 2$ is minimum at $x = 2$.

24. Given the regression lines $9x - 4y + 15 = 0$ and $25x - 6y - 7 = 0$. Obtain the means of x and y .

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)*Answer any six questions.**Each one carries 5 marks.*

25. For a given matrix $A = \begin{bmatrix} -3 & 4 \\ 3 & 2 \end{bmatrix}$. Find $(A^T)^T A$.

26. Define coefficient of variation. Obtain coefficient of variation of 20, 22, 19, 22, 23.

Turn over

27. Find the equilibrium price and quantity, if the demand and supply equations are respectively, $2p = 14 - x$ and $12p = 14 + x$.
28. Define kurtosis. What are the various measures of kurtosis ?
29. What are regression coefficients ? What are their properties ?
30. Explain the method of Lorenz curve and Gini Coefficient.

31. If $A = \begin{bmatrix} 5 & 7 & 2 \\ 2 & 3 & 1 \\ 4 & 6 & 2 \end{bmatrix}$, show that A is singular.

32. Write a note on graphical methods for correlation and regression.

(6 × 5 = 30 marks)

Section D (Essay Type)

*Answer any two questions.
Each one carries 12 marks.*

33. Using matrix inverse method solve the equations to get the values of x , y and z .

$$2x + y + z = 1 ; x - y + 4z = 0 ; x + 2y - 2z = 3.$$

34. Define skewness. How is it measured? Find the quartile coefficient of skewness to the following data :-

Class	:	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Frequency	:	3	4	68	30	10	6	2

35. Matrix A is given by $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix}$, show that $A A^{-1} = I$.

36. Define rank correlation coefficient. The following are the ranks obtained by 10 students in Economics and Mathematics :

Economics	:	1	2	3	4	5	6	7	8	9	10
Mathematics	:	1	4	2	5	3	9	7	10	6	8

To what extent is the knowledge of students in the two subjects related ?

(2 × 12 = 24 marks)

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(Pages : 4)

Name.....

Reg. No.....

THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS—UG)

Core Course—Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A

*Answer all questions.
½ marks each.*

1. If $\log_2 x = 5$, then $x =$
 - (a) 16.
 - (b) 32.
 - (c) 8.
 - (d) 25.
2. The number of elements of a 3×3 matrix :
 - (a) 3.
 - (b) 6.
 - (c) 9.
 - (d) 3.
3. The value of determinant is :
 - (a) Real number.
 - (b) A matrix.
 - (c) A symmetric matrix.
 - (d) Zero matrix.
4. The equation of a straight line which cuts both axes at a distance of 2 units from the origin is :
 - (a) $x + y = 2$.
 - (b) $x - y = 2$.
 - (c) $-x + y = 2$.
 - (d) $-x - y = 2$.
5. Which of the following is not one to one function in R :
 - (a) $|x|$.
 - (b) $2x$.
 - (c) $2x + 3$.
 - (d) x .
6. If two rows of a determinant are identical, then its value :
 - (a) 1.
 - (b) 0.
 - (c) -1.
 - (d) None of these.
7. Gini coefficient is associated with :
 - (a) Income.
 - (b) Price.
 - (c) Wage.
 - (d) Labour.

Turn over

8. Lack of symmetry means :
- (a) Positive skewness. (b) Negative skewness.
(c) Skewness. (d) Kurtosis.
9. Points of inflexion of ogives correspond to :
- (a) Mode. (b) Median.
(c) Mean. (d) Geometric mean.
10. Rank correlation is associated to :
- (a) Any data. (b) Qualitative data.
(c) Quantitative data. (d) Discrete data.
11. The maximum value of correlation coefficient is :
- (a) 1. (b) 0.
(c) 2. (d) 10.
12. The Minister of Statistics and Programme Implementation is :
- (a) Dr.V.K. Singh. (b) Rahul Gandhi.
(c) Rajnadh Singh. (d) Vasana.

(12 × ½ = 6 marks)

Section B (Very Short Answer Questions)*Answer any ten questions.**Each carries 2 marks.*

13. Solve the quadratic equation $10x^2 - 9x - 1 = 0$.
14. Solve $\log_2(x^2 - 4) = 5$.
15. State any four laws of exponents.
16. Define rank of a matrix.
17. If $A = \begin{bmatrix} 1 & 5 \\ 2 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 \\ 7 & 0 \end{bmatrix}$, find $2A + 3B$.
18. Distinguish between one to one function and many one function.
19. Find the cofactor of the element 2 in $A = \begin{bmatrix} 1 & 4 & 8 \\ 0 & 3 & 7 \\ 5 & 2 & 9 \end{bmatrix}$.
20. Define parallel lines with examples.
21. The number of elements of a matrix is 12. What is the possible orders of the matrix ?

22. State any two limitations of Statistics.
 23. What are deciles ?
 24. Mention any two methods for measuring correlation.

Section C (Short Essay/Problem Type)

(10 × 2 = 20 marks)

Answer any six questions.
 Each carries 5 marks.

25. Define the following with examples.
 (i) Transpose of a matrix ; (ii) Inverse of a matrix.
 26. Explain the construction of a Pie diagram.
 27. Solve the following system of linear equations using Cramer's Rule :
 $x + 2y + z = 8$; $2x - y + 2z = 6$; $3x + 4y + z = 14$.
 28. Define Geometric mean (G) and Harmonic mean (H). Compute G and H for 10, 20, 20 and 40.
 29. Explain the Principle of least squares.
 30. Distinguish between Regression and Correlation.
 31. Define determinant of a matrix and state any four properties.
 32. Obtain the equation of a straight line which passes through (1, 2) and (3, 4). Also find slope and intercept.

Section D (Essay Questions)

(6 × 5 = 30 marks)

Answer any two questions.
 Each carries 12 marks.

33. (i) Find the inverse of the following matrix : $\begin{pmatrix} 1 & 5 & 9 \\ 2 & 6 & 8 \\ 3 & 7 & 5 \end{pmatrix}$.

- (ii) Evaluate the determinant $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$.

34. Explain any four measures of central tendency.

Turn over

35. Calculate equation of regression lines, regression coefficients and correlation coefficient from the following data :

Purchase	62	72	98	76	81	56	76	92	88	49
Sale	112	124	131	117	132	96	120	136	97	85

36. (i) Compute mean deviation from the mean for the following data :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	3

- (ii) Find the variance of first 10 natural numbers.

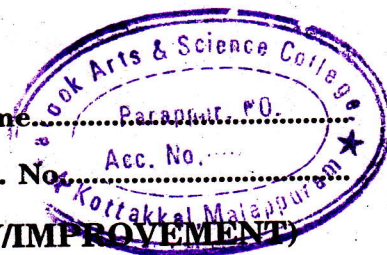
(2 × 12 = 24 marks)

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(Pages : 3)

Name.....Parappur P.O.....

Reg. No.....Acc. No.....



**THIRD SEMESTER B.A. DEGREE (SUPPLEMENTARY/IMPROVEMENT)
EXAMINATION, NOVEMBER 2015**

(UG—CCSS)

Core Course—Economics

EC 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

(2013 Admissions)

Time : Three Hours

Maximum : 30 Weightage

Part I (Objective Type Questions)

(Include Multiple Choice, Fill in the blanks and Answer in Single Word)

Answer all twelve questions.

1. The most frequently occurring value of a variable is called :
(a) Mean. (b) Median.
(c) Mode. (d) S.D.
2. The Standard deviation of the values : 5, 5, 5, 5 is :
(a) 0. (b) 5.
(c) 20. (d) 5^4 .
3. Which of the following index number satisfies the time reversal test and factor reversal test ?
(a) Fisher's I.N. (b) Kelly's I.N.
(c) Marshall-Edgeworth I.N. (d) Laspeyre's I.N.
4. Econometrics is a combination of Economic theory, Mathematical Economics and _____.
(a) Demography. (b) History.
(c) Physics. (d) Statistics.
5. Arithmetic mean of lower and upper limits of a class is called _____.
6. A representative sub-group of a population is called a _____ of that population.
7. If $r_{x,y} = 0.4$ then $r_{2x, 2y} =$ _____. where r stands for Karl Pearson's correlation coefficient.
8. The maximum possible value of correlation coefficient is _____.
9. If Laspeyre's and Paasche's indices are 122 and 124, then Fisher's I.N. is _____.

Turn over

10. The 3-point moving average of the values 10, 11, 12 is _____.
11. The coefficient of elasticity always varies between 0 and _____.
12. The first stage in any Econometric research is _____.

(12 × ¼ = 3 weightage)

Part II (Short Answer Type Questions)

Answer all nine questions.

13. What is a nominal variable ? Give an example.
14. What is meant by seasonal variation ?
15. Distinguish between positive and negative correlation.
16. Explain the method of calculating Spearman's rank correlation coefficient.
17. Discuss the terms 'splicing' and 'deflating'.
18. Mention any two uses of consumer price index number.
19. What is meant by NSE-NIFTY ?
20. Write down the normal equations involved in fitting a straight line $Y = a + bx$ by the method of least squares.
21. Mention any two limitations of Econometrics.

(9 × 1 = 9 weightage)

Part III (Short Essay or Paragraph Questions)

Answer any five questions from seven.

22. Explain the procedure of constructing a histogram.
23. Explain the desirable characteristics of a good average.
24. Explain Scatter diagram method.
25. What are regression lines ? Why there are two regression lines ?
26. Explain the time reversal test and factor reversal test.
27. Write a short note on consumer price index.
28. What are the various steps involved in an Econometric Research ?

(5 × 2 = 10 weightage)

Part IV (Essay Questions)

Answer any two questions from three.

29. Calculate : (i) mean ; (ii) median ; (iii) standard deviation and ; (iv) range from the following data : 11, 13, 14, 15, 30, 12, 14, 16, 19, 22.

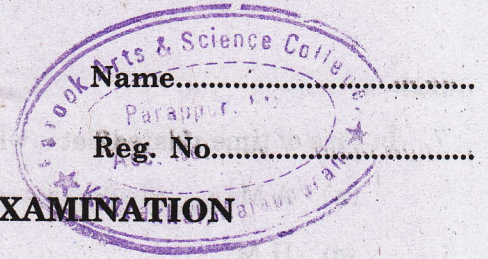
30. A study on the effect of bus ticket prices upon the number of passengers produced the following data :

<i>Ticket price (Rs.)</i>	15	20	25	30	40	50
<i>Passengers per 10 km.</i>	440	430	450	370	340	370

- (i) Plot these data.
(ii) Develop the estimating equations that best describes the data.
(iii) Predict the number of passengers per 10 kms if the ticket price were Rs. 35.
31. (i) Explain the different components of a time series.
(ii) A survey by the national dairy products association produced the following data. Construct Laspeyre's index, taking 2001 as the base year :

<i>Product</i>	<i>Average price per unit</i>		<i>Total quantity 2001</i>
	2001	2005	
Cheese	145	149	26
Milk	160	165	276
Butter	70	80	31

(2 × 4 = 8 weightage)



**THIRD SEMESTER B.A. DEGREE EXAMINATION
NOVEMBER 2017**

(CUCBCSS—UG)

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

Answer all questions.

Each question carries ½ mark.

1. $2x^3 - 54 = 0$, the value of x is _____.

(a) 9.	(b) - 9.
(c) 3.	(d) - 3.

2. Find the value of $[256]^{\frac{1}{4}}$ is _____.

(a) 16.	(b) 8.
(c) 4.	(d) 2.

3. For an orthogonal matrix $AA^T =$ _____.

(a) Identity matrix.	(b) The matrix A.
(c) Zero matrix.	(d) None of these.

4. The order of a matrix A is $m \times n$, that of B is $n \times q$ then the order of AB is _____.

(a) $n \times n$.	(b) $m \times n$.
(c) $m \times q$.	(d) $n \times q$.

5. A function $f(x)$ is called an even function, if _____.

(a) $f(-x) = -f(x)$.	(b) $f(-x) = f(x)$.
(c) $f(x^2) = f(x)$.	(d) None of these.

6. Which of the following is a mathematical average ?

(a) Median.	(b) Mode.
(c) Geometric mean.	(d) None of these.

Turn over

7. In case of time related data, which of the following is preferred ?
- (a) A M. (b) G M.
(c) H M. (d) Median.
8. Median and _____ decile are same.
- (a) 7th. (b) 5th.
(c) 2nd. (d) None of these.
9. Square root of variance is known as :
- (a) Quartile deviation. (b) Mean deviation.
(c) Standard deviation. (d) Range.
10. Gini Coefficient is associated with :
- (a) Lorenz curve. (b) Ogives.
(c) Frequency curve. (d) None of these.
11. If X and Y are perfectly obeys the equation $2x - 5y + 2 = 0$, the correlation between X and Y is _____.
- (a) - 1. (b) + 1.
(c) 0. (d) None of these.
12. The regression co-efficient of x on y is _____.
- (a) $\frac{\text{Cov}(X, Y)}{V(Y)}$. (b) $\frac{\text{Cov}(X, Y)}{V(X)}$.
(c) $\frac{\text{Cov}(X, Y)}{SD(Y)}$. (d) None of these.

(12 × ½ = 6 marks)

Section B (Short Answer Type)

*Answer any ten questions.
Each one carries 2 marks.*

13. Find the value of $[16]^{\frac{1}{4}} + \left[\frac{1}{8}\right]^{\frac{1}{3}}$.

14. If $\log_{\sqrt{8}} x = \frac{4}{3}$, find x .
15. Define the conditions for maximum of a function.
16. When two matrices will become equal ?
17. If the matrix $A = \begin{bmatrix} -3 & 4 & 2 \\ 7 & 0 & 5 \\ 6 & -4 & -1 \end{bmatrix}$. Write A^T .
18. Define orthogonal matrix.
19. Solve for x , if $\frac{2}{x} + \frac{x}{2} = 2$.
20. Define Geometric Mean.
21. The demand and supply curves are $D = 19 - 5p$ and $S = 5p - 1$. Find the equilibrium price.
22. Find the derivative of $x \cos x + 2e^x$ with respect to x .
23. Find the roots of $2x^2 - 5x + 2 = 0$.
24. Given the regression lines y on x as $12x + 21y + 10 = 0$. Obtain the regression co-efficient of y on x .

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)

Answer any six questions.

Each one carries 5 marks.

25. If $A = \begin{bmatrix} 2 & -4 \\ 3 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 8 & 4 \\ 6 & 5 \end{bmatrix}$ verify whether $AB = BA$.
26. Define coefficient of variation. Obtain coefficient of variation of 20, 22, 19, 22, 23.
27. Find the equilibrium price and quantity, if the demand and supply equations are respectively, $2p = 14 - x$ and $12p = 14 + x$.
28. Describe the various measures of dispersion.
29. Obtain Pearson's measure of skewness for a group of 10 items with their sum 452, sum of squares 24270 and the mode 43.7.
30. Explain the method of Lorenz curve and Gini Co-efficient.

Turn over

31. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$.

32. Write a note on rank correlation co-efficient.

(6 × 5 = 30 marks)

Section D (Essay Type)

Answer any two questions.

Each one carries 12 marks.

33. Using Cramer's rule solve the equations to get the values of x , y and z .

$$2x + y + z = 1$$

$$x - y + 4z = 0$$

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

34. Define Kurtosis. How is it measured? Find the co-efficient of Kurtosis based on quartiles to the following data :

Class	:	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35
Frequency	:	3	4	68	30	10	6	2

35. Matrix A is given by $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix}$, show that $A A^{-1} = I$.

36. Find the regression lines and predict the value for x , when $y = 90$ and the value of y when $x = 100$.

X	:	65	66	67	67	68	69	70	72
Y	:	67	68	65	68	72	72	69	71

(2 × 12 = 24 marks)

D 51339

(Pages : 4)

Name.....

Reg. No.....

THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Core Course

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

Answer all questions.

Each question carries 1 mark.

1. The value of $(25)^{\frac{-3}{2}}$ is :

(a) $\frac{1}{25}$

(b) $\frac{1}{125}$

(c) 25.

(d) 125.

2. Find x if $\log_3 x = 4$:

(a) 9.

(b) 27.

(c) 81.

(d) 243.

3. If $\log 7 = 0.8451$, find the number of digits in 7^{20} .

(a) 14.

(b) 15.

(c) 16.

(d) 17.

4. The degree of a linear equation is :

(a) 1.

(b) 2.

(c) 3.

(d) 4.

5. Let the matrix A is of order 2×3 and another matrix B is of order 3×2 , then the product AB is of order :

(a) 2×3 .

(b) 3×2 .

(c) 3×3 .

(d) 2×2 .

Turn over

6. Let A be a matrix such that $|A| = 0$, then A is said to be :
- (a) Orthogonal. (b) Symmetric.
(c) Singular. (d) Non-singular.
7. With the help of ogives, one can determine :
- (a) Mean. (b) Median.
(c) Mode. (d) Geometric mean.
8. Sum of the deviations about mean is :
- (a) Zero. (b) Minimum.
(c) Maximum. (d) One.
9. If for values of X, A.M. = 25 and H.M. = 9, then the G.M. is :
- (a) 17. (b) 15.
(c) 5.83. (d) 16.
10. If a constant value 5 is subtracted from each observation of a set of data, the variance is :
- (a) Reduced by 5. (b) Reduced by 25.
(c) Unaltered. (d) Increased by 25.
11. If the correlation coefficient $r = 0$, the angle between the two lines of regression is :
- (a) 0. (b) 90.
(c) 60. (d) 30.
12. The lines of regression intersect at the point :
- (a) (0, 0). (b) (1, 1).
(c) (X, Y). (d) (\bar{X}, \bar{Y}) .

(12 × ½ = 6 marks)

Section B (Short Answer Type)

*Answer any ten questions.
Each question carries 2 marks.*

13. Simplify $63x^8y^5 \div 9x^5y^3$.

14. Simplify $(9)^{\frac{3}{2}} (243)^{\frac{4}{5}} (729)^{\frac{5}{6}}$.

15. Define Logarithm.

16. If $\log 2 = 0.3010$ and $\log 3 = 0.4771$, find $\log 12$.

17. Define a quadratic equation. Also define the quadratic formula.

18. Define diagonal matrix with an example.
19. Define rank of a matrix.
20. Show that $A = \begin{bmatrix} 3 & 4 & 2 \\ 0 & 1 & -3 \\ 2 & -2 & 8 \end{bmatrix}$ is non-singular.
21. The mean wage of 100 labourers working in a factory running two shifts of 60 and 40 workers respectively is Rs. 38. The mean wage of 60 labourers working in the morning shift is Rs. 40. Find the mean wage of labourers working in the evening shift.
22. Define standard deviation and coefficient of variation.
23. Explain Scatter diagram.
24. In the study of regression equations, following values are obtained : $b_{yx} = 0.25, r = 0.42, \sigma_y = 4$, find σ_x .

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)

Answer any **six** questions.
Each question carries 5 marks.

25. Find the value of $\left[\frac{x^{-2}y}{x^3y^{-4}} \right]^{-3} \div \left[\frac{xy^{-1}}{x^3y^{-3}} \right]^{-5}$.
26. Evaluate $\frac{24.395 \times (3.16)^3}{8.79}$ using logarithm.
27. Demand for goods of an industry is given by the equation $pq = 100$ where p is the price and q is the quantity. Supply is given by the equation $20 + 3p = q$. What is the equilibrium price and quantity ?
28. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{bmatrix}$, find AB and BA . Show that $AB \neq BA$.
29. The cost of manufacturing and selling a tin of chocolate powder is Rs. 15, with a fixed overhead cost of Rs. 900. Each is sold out for Rs. 20 per tin. Determine (i) Cost function ; (ii) Revenue function ; (iii) Profit function ; (iv) What is the cost, revenue and profit when 1000 tins are manufactured and sold ?

Turn over

30. Find the harmonic mean from the following data :

Size	:	6	10	14	18
Frequency	:	20	40	30	10

31. The mean and standard deviation of 100 observations were worked out as 40 and 5 respectively by a computer who by mistake took value 50 in place of 40 for one observation. Recalculate the correct mean and standard deviation.

32. The ranking of 10 individuals at the start and at the finish of a course of training are as follows :

Individuals	:	A	B	C	D	E	F	G	H	I	J
Rank before	:	1	6	3	9	5	2	7	10	8	4
Rank after	:	6	8	3	2	7	10	5	9	4	1

Calculate Spearman's rank correlation coefficient.

(6 × 5 = 30 marks)

Section D (Essay Type)

*Answer any two questions.
Each question carries 12 marks.*

33. Solve the following system of equations

$$x + 9y - z = 4; 2x + 7y + 3z = 7; 3x + 10y + 4z = 9.$$

34. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & -3 & 0 \\ 1 & 1 & -1 \end{bmatrix}$, show that $A^3 + 4A^2 - A - 12I = 0$.

35. Explain mean, median and mode.

36. From the following data, obtain the two regression equations :

Sales	:	91	97	108	121	67	124	51	73	111	57
Purchase	:	71	75	69	97	70	91	39	61	80	47

(2 × 12 = 24 marks)

THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2019

(CUCBCSS—UG)

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

*Answer all questions.**Each question carries ½ mark.*

1. If $AA^T = I$, the matrix A is called _____.
(a) Diagonal matrix. (b) Symmetric matrix.
(c) Orthogonal matrix. (d) Skew symmetric.
2. If $|A| = 0$, the matrix A is called _____.
(a) Symmetric matrix. (b) Singular matrix.
(c) Non-singular matrix. (d) None of these.
3. The value of $\log_3 81$ to base 3 is _____.
(a) 2. (b) 3.
(c) 4. (d) 5.
4. _____ is a positional average.
(a) Mean. (b) Mode.
(c) Quartile. (d) None of these.
5. A diagram of circle is _____.
(a) Pie diagram. (b) Line diagram.
(c) Bar diagram. (d) None of these.
6. If $8x + 2 = 18$, the x is equal to :
(a) 2. (b) 4.
(c) 6. (d) 8.

Turn over

7. The function $y = 3e^x$ is called :
- (a) Multivariate function. (b) Exponential function.
(c) Explicit function. (d) Implicit function.
8. _____ is the middle most value of the observations when they are arranged in ascending order of magnitude.
- (a) Mean. (b) Mode.
(c) Median. (d) None of these.
9. If X and Y related using the relation $Y = -4X$, the correlation between X and Y is _____
- (a) 0. (b) + 1
(c) - 1. (d) None of these.
10. Correlation co-efficient is _____ value.
- (a) Absolute value. (b) Relative value.
(c) Average value. (d) None of these.
11. If the two regression coefficients are 0.2 and 0.8, the correlation co-efficient is _____.
- (a) 0.2. (b) 0.4.
(c) 0.8. (d) None of these.
12. The point of intersection of the two regression lines is _____.
- (a) (-1, +1) (b) (0, 0).
(c) (x, y) (d) None of these.

(12 × ½ = 6 marks)

Section B (Short Answer Type)

Answer any ten questions.

Each question carries 2 marks.

13. Find the value of $(81/16)^{3/4}$.
14. Explain system of quadratic equations.
15. Find A^{-1} , for the matrix $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$.

16. Define percentile.
17. Explain adjoint of a matrix.
18. Define cofactor of a matrix.
19. Explain Cramer's rule for solving linear equations.
20. What are the limitations of statistics?
21. If $X = 345.02 \times 273.43 \times 496.56$, find $\log X$.
22. Describe frequency polygon.
23. Explain the use of Gini coefficient.
24. Describe Karl-Pearson's co-efficient of correlation.

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)

*Answer any six questions.
Each question carries 5 marks.*

25. Explain the origin and development of statistics.
26. Find the regression equation of X on Y for the following data :

X	:	28	26	32	31	37	30	36	34	39	40
Y	:	75	74	82	81	90	88	85	92	92	95
27. What is the mathematical relationship among average revenue, marginal revenue and elasticity?
28. Explain various measures of skewness.
29. Draw a histogram and frequency polygon for the following data :

Class	:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	:	7	10	20	13	17	10	14	9
30. Compute rank correlation coefficient for the following data :

X	:	60	48	36	52	41	58	13
Y	:	75	51	39	55	49	62	17

Turn over

31. Examine whether the matrix A is non-singular or not :

$$A = \begin{matrix} & \begin{matrix} 1 & 2 & 3 \end{matrix} \\ \begin{matrix} 3 \\ 2 \end{matrix} & \begin{matrix} 3 & 6 & 9 \\ 4 & 4 & 6 \end{matrix} \end{matrix}$$

32. Explain the graphical method of obtaining the median.

(6 × 5 = 30 marks)

Section D (Essay Type)

Answer any two questions.

Each question carries 12 marks.

33. Compute arithmetic mean, median and mode from the following data and verify the relation between them ?

Class	:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	:	2	4	10	15	22	18	12	8	5

34. Explain skewness. Find the quartile coefficient of skewness for the following data :

Class	:	0-5	5-10	10-15	15-20	20-25	25-30	30-35
Frequency	:	3	10	14	25	17	9	2

35. Solve the simultaneous equations :

(i) $X - Y = 6$ and $X^2 + Y^2 = 68$.

(ii) $X + Y = 49$ and $X^2 - 2Y^2 = 178$.

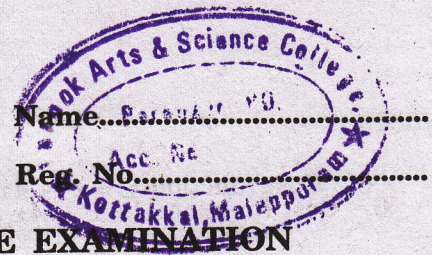
36. Find $A^3 + 4A^2 - A - 12I$, where

$$A = \begin{matrix} & \begin{matrix} 1 & 2 & 5 \end{matrix} \\ \begin{matrix} 2 \\ 4 \end{matrix} & \begin{matrix} 2 & 3 & 4 \\ 4 & 5 & 8 \end{matrix} \end{matrix}$$

(2 × 12 = 24 marks)

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**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020**

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

*Answer all questions.
Each question carries ½ mark.*

1. $k = (3x^6)^0 - 6$, the value of k is _____.
(i) - 3. (ii) - 5.
(iii) - 6. (iv) 0.
2. A matrix with equal number of rows and columns is called a _____.
(i) Diagonal matrix. (ii) Square matrix.
(iii) Zero matrix. (iv) None of these.
3. For an orthogonal matrix A , $AA^T =$ _____.
(i) I . (ii) A .
(iii) A^T . (iv) None of these.
4. $\log_a a =$ _____.
(i) 0. (ii) 1.
(iii) $\log a$. (iv) a .
5. For two matrices A and B with orders $m \times n$, and $p \times q$, AB is possible when _____.
(i) $m = q$. (ii) $m = p$.
(iii) $n = p$. (iv) $n = q$.

Turn over

6. Cost function $C = x^2 + 4x$, then MC is _____.
- (i) $\frac{x^3}{3} + 4\frac{x^2}{2}$. (ii) $2x + 4$.
- (iii) x^2 . (iv) None of these.
7. _____ is a two dimensional diagrammatic data representation.
- (i) Frequency curve. (ii) Bar diagram.
- (iii) Pie diagram. (iv) Pictogram.
8. Geometric mean of two values is 4. One of them is 8 the second value is _____.
- (i) 2. (ii) 4.
- (iii) 8. (iv) 16.
9. A value which divides the observations into two equal parts is _____.
- (i) Mode. (ii) Median.
- (iii) Decile. (iv) Mean deviation.
10. For a positively skewed distribution, _____.
- (i) Mean = Mode. (ii) Mean < Mode.
- (iii) Mean > Mode. (iv) None of these.
11. If the regression lines are perpendicular, the co-efficient of correlation is _____.
- (i) + 1. (ii) - 1.
- (iii) 0. (iv) None of these.
12. Absolute value of the co-efficient of correlation is _____ of regression co-efficients.
- (i) AM. (ii) HM.
- (iii) Median. (iv) GM.

(12 × ½ = 6 marks)

Section B (Short Answer Type)

Answer any ten questions.

Each one carries 2 marks.

13. Find the value of $\left[\sqrt[3]{125}\right]^{-2}$.

14. Define Linear equation.

15. Define order of a matrix.
16. Solve the equation $x^2 - 6x + 8 = 0$.
17. Define Symmetric matrix.
18. For the matrix $A = \begin{bmatrix} 4 & 0 \\ 0 & 4 \end{bmatrix}$, if $kA = I$ find k .
19. If $A = \begin{bmatrix} 5 & 7 & 2 \\ 2 & 3 & 1 \\ 4 & 6 & 2 \end{bmatrix}$, show that $|A| = 0$.
20. Define Geometric mean.
21. Find the marginal cost when the production is 5 units if the cost function of a firm is
- $$C = x^3 - 3x^2 + 2x.$$
22. Obtain $\frac{d^2R}{dx^2}$ where $R = 2x - 4x^2$.
23. Show that $f(x) = 3x^2 - 18x + 7$ is minimum at $x = 3$.
24. Define Scatter diagram.

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)*Answer any six questions.**Each one carries 5 marks.*

25. For the matrices $A = \begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 4 & -2 \end{bmatrix}$, show that $(A + B)^T = A^T + B^T$.
26. Define mean deviation about mean. Obtain the mean deviation about mean for the data 5, 8, 10, 14, 15, 18, 20 and 22.

Turn over

27. Find the elasticity of demand for the demand function $4q = \frac{64}{p^3}$.
28. Define Skewness. What are the various measures of skewness ?
29. Given the regression lines $9x - 4y + 15 = 0$ and $25x - 6y - 7 = 0$. What are the regression co-efficients x on y and y on x ?
30. Explain the method of Lorenz curve and Gini Coefficient.

31. If $A = \begin{bmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{bmatrix}$, show that $|A| = 0$.

32. Explain rank correlation coefficient.

(6 × 5 = 30 marks)

Section D (Essay Type)

Answer any two questions.

Each one carries 12 marks.

33. Use Cramer's rule, solve the equations to get the values of x , y and z .

$$3x + y + z = 1; 2x + 2z = 0; 5x + y + 2z = 2.$$

34. Define Kurtosis. How is it measured ? Find the co-efficient of kurtosis to the following data :

Class	:	100-120	120-140	140-160	160-180	180-200	200-220	220-240
Frequency	:	1	2	6	20	11	3	2

35. Matrix A and B are given by $A = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$, then show that

(i) $[A + B]^2 \neq A^2 + 2AB + B^2$; and

(ii) $(A + B)(A - B) \neq A^2 - B^2$.

36. Explain direct and inverse correlation. Obtain Pearson's co-efficient of correlation between x and y using the following data :

x	:	12	20	15	22	18	24	20	12	15	22
y	:	30	35	28	36	29	39	30	25	30	38

(2 × 12 = 24 marks)