

C 41031

(Pages : 4)

Name.....

Reg. No.....

**FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2023**

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

(2017—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Use of calculator is permitted.***Part A***Answer all questions.**Each question carries ½ mark.*1. Find the derivative $\log x$:(a) $\log x$.(b) $\frac{1}{x}$.(c) x^2 .

(d) None of these.

2. Find $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$:

(a) 1.

(b) 3.

(c) 2.

(d) 4.

3. It is the rate at which the consumer is prepared to exchange one commodity for another marginal rate of substitution of x for y :

(a) MRS.

(b) MRPT.

(c) MRTS.

(d) None of these.

4. It measures the percent change in quantity purchased of x_1 due to one percent change in the price of related good, keeping the own price and consumer's income constant :

(a) Cross elasticity.

(b) Price elasticity.

(c) Output elasticity.

(d) Income elasticity.

Turn over

5. The price index as the arithmetic mean of Laspeyre's and Paasche's indices was expounded by:
- (a) Irving Fisher. (b) Drobish and Bowley.
(c) Walsh. (d) Kelley.
6. Combining of two index number series having different base periods into one series with common base period is known as :
- (a) Base shifting. (b) Splicing.
(c) Both (a) and (b). (d) None of these.
7. Method of least squares to fit in the trend is applicable only if the trend is :
- (a) Linear. (b) Parabolic.
(c) Both (a) and (b). (d) Neither (a) nor (b).
8. Moving average method of fitting trend in a time series data removes the effect of :
- (a) Short term movements. (b) Long term movements.
(c) Cyclic variations. (d) None of these.
9. Vital statistics is mainly concerned with :
- (a) Marriages. (b) Deaths.
(c) Births. (d) All the above.
10. The death rate of women due to delivery of children is termed as :
- (a) Maternal mortality rate. (b) Neonatal mortality rate.
(c) Neonatal mortality rate. (d) Infant mortality rate.
11. What is the chance of getting a head when a coin is tossed :
- (a) $\frac{1}{4}$. (b) $\frac{3}{4}$.
(c) $\frac{1}{3}$. (d) $\frac{1}{2}$.
12. Probability of an event A given that B has happened is called :
- (a) Relative probability. (b) Conditional probability.
(c) Axiomatic probability. (d) None of these.

(12 × ½ = 6 marks)

Part B (Short Answer Type Questions)

Answer any **ten** questions.

Each one carries 2 marks.

13. Define price elasticity of demand.
14. The cost function is defined $x = a + bq + cq^2$, where a, b, c are constants, find AC and MC.
15. Find the total differential of $y = 6x^2 + 8z^2 - 0.3xz$.
16. Prove that Marginal cost must equal marginal revenue at the profit maximizing level of output.
17. Define Marginal Productivity of capital and labour.
18. Define Infant Mortality rate.
19. Define Sex ratio.
20. Mention the two important uses of Index numbers.
21. What is Time reversal test ?
22. A card is drawn from a pack of card. What is the probability that it is (i) a king or a Queen
(ii) a king or a Spade.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

Answer any **six** questions.

Each one carries 5 marks.

23. Given the demand function $12q + 7p = 216$, find price elasticity of demand at $p = 20$.
24. Find f_1 and f_2 given $y = f(x_1, x_2) = x_1^3 + 2x_1x_2^2 + 3x_2^2$.
25. Briefly explain the various applications of derivatives in Economics.
26. Write a short note on Returns to Scale.
27. A box contains 3 silver coins and 4 copper coins. A second box contains 5 copper coins and 4 silver coins. One of the boxes is selected at random and a coin is selected from it. What is the probability that it is a silver coin ?
28. Briefly explain Bayes' Theorem of Probability.

Turn over

29. Compute Consumer Price Index number for the following data :

Commodity	Quantity	Base year Price	Current year Price
A	7	80	90
B	9	90	100
C	10	100	80
D	6	40	50

30. Explain important measurement of Mortality.
 31. Describe briefly the various methods of determining trend in a time series.
 32. Define Index numbers and explain their characteristics and limitations.

(6 × 5 = 30 marks)

Part D (Essay Questions)

Answer any **two** questions.

Each one carries 12 marks

33. Briefly explain the four components of Time series analysis.
 34. Calculate Crude death rate and Crude birth rate for the following data :

Age group (Years)	Population	Live births	Deaths
0–20	10000	40	220
20–30	11000	300	140
30–50	7000	850	110
50 and above	1000	10	90
Total	29000	1200	560

35. Find the first, second and cross partial derivatives for $z = 7x^3 + 9xy + 2y^5$.
 36. A bag contains 4 white and 6 black balls. Two balls are drawn one after another with replacement,
 (i) What is the probability that both are white ; and (ii) Find the probability if the first ball is not replaced before the second drawn.

(2 × 12 = 24 marks)

C 21359

(Pages : 4)

Name.....

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FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2022

Economics

ECO4B05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

(2014—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Use of calculator is permitted.***Part A***Answer all questions.*

- It is the responsiveness of economic variables to change in other economic variables:
 - Propensity.
 - Elasticity.
 - Economic model.
 - Function.
- Find $\lim_{x \rightarrow 0} \frac{e^x - 1}{x - 3}$:
 - 1.
 - 0.
 - e^x .
 - $e^x - 1$.
- As the amount of change in the variable measured on Y axis with respect to change in the variable measured on the X axis :
 - Function.
 - Slope
 - Intercept.
 - Equation.
- Find the derivative x^6 :
 - $6x^5$.
 - x^6 .
 - $6x^6$.
 - $5x^5$.
- Total revenue is $12x - 3x^2$, find MR :
 - $12 - 6x$.
 - $12x - 3x^2$.
 - $12x - 3x$.
 - None of these.

Turn over

6. Laspeyre's Index number is based on :
- (a) Average of current and base year quantities.
 - (b) Current year quantities.
 - (c) Base year quantities.
 - (d) None of these.
7. The index used to measure changes in total money value is called :
- (a) Price index.
 - (b) Value index.
 - (c) Quantity index.
 - (d) None of these.
8. The time series analysis helps :
- (a) To compare the two or more series.
 - (b) To know the behaviour of business.
 - (c) To make predictions.
 - (d) All the above.
9. Least square method of fitting a trend is :
- (a) Most exact.
 - (b) Least exact.
 - (c) Full of subjectivity.
 - (d) Mathematically unsound.
10. Consumer price index reflects on the price changes experienced by :
- (a) An individual.
 - (b) A particular family.
 - (c) All families of a population.
 - (d) All the above.
11. Fertility rate mainly depends on :
- (a) Total female population.
 - (b) Total population.
 - (c) Female population of child bearing age.
 - (d) Number of newly born babies.
12. Classical probability is measured in terms of :
- (a) A ratio.
 - (b) An absolute value.
 - (c) Absolute value and ratio both.
 - (d) None of these.

(12 × ½ = 6 marks)

Part B (Short Answer Type Questions)

Answer any ten questions.

Each one carries 2 marks.

13. Determine the maxima and minima values of $4x^3 + 9x^2 - 12x + 13$.
14. If the Marginal revenue is 25 and the elasticity of demand with respect to price is 2. Find average revenue.
15. Define Price elasticity of demand.
16. Find $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x - 3}$.
17. What do you mean by Optimization ?
18. Define Simple index number.
19. Define Deflating.
20. Explain the concept of Seasonal variations.
21. Define general fertility rate.
22. Explain Conditional probability.
23. A ball is drawn from a bag containing 4 white, 6 black and 5 green balls. Find the probability that a ball drawn is : (i) Black ; and (ii) Not green.
24. Write a note on Convexity and Concavity.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

Answer any six questions.

Each one carries 5 marks.

25. Find the first order partial derivative of $u = \log(x^2 + y^2)$.
26. Briefly explain the marginal concepts of Economics.
27. Explain the methods for construction of Index numbers.
28. Explain the concept of : (i) Sample space ; (ii) Sample point ; and (iii) Equally likely events.

Turn over

29. A bag contains 4 white, 2 black, 3 yellow and 3 red balls. What is the probability of getting a white or a red ball at random in a single draw of one.
30. Explain Crude death rate and Specific death rate.
31. Briefly explain the components of Time series.
32. Construct the index number for 2018 taking 2008 as base by price relative method using Arithmetic mean :

Commodities		A	B	C	D
Price in Rs. (2008)	...	10	20	30	40
Price in Rs. (2018)	...	13	17	60	70

(6 × 5 = 30 marks)

Part D (Essay Questions)

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

33. Fit a straight line of the form $y = a + bx$ to the following data :

Year	...	2012	2013	2013	2015	2016	2017	2018
Values	...	10	18	15	22	20	25	28

34. Calculate the Laspeyzer's index, Paasche's index number and Fisher's index number from the following data :

Commodity	Price		Quantity	
	Base year	Current year	Base year	Current year
A	4	7	10	8
B	5	9	8	6
C	6	8	15	12
D	2	2	5	6

35. A firm produces two goods, with output levels q_1 and q_2 and faces the total cost function $TC = 45 + 125q_1 + 84q_2 - 6q_1^2q_2^2 + 0.8q_1^3 + 1.2q_2^3$. Find two relevant marginal cost functions.
36. (i) Explain the properties of Probability.
(ii) Briefly explain Bayes's Theorem.

(2 × 12 = 24 marks)

C 2290

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**FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021**

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

Time : Three Hours

Maximum : 80 Marks

Use of Calculator is permitted.

Part A

Answer all the questions.

Each question carries ½ mark.

1. $\frac{dz}{dx}$ if $z = 1 - 3xy$ is :

a) $1 - 3x$.

b) $1 - 3y$.

c) $-3x$.

d) $-3y$.

2. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$ is:

a) 0.

b) 4.

c) 8.

d) 16.

3. The total cost function is $\frac{1}{3}Q^3 + 20$. The marginal cost function is

a) $3Q^2 + 20$.

b) Q^2 .

c) 20.

d) $3Q^2 + Q$.

Turn over

4. Which index number satisfies the time reversal test ?
- a) Laspeyzer's Index number. b) Paasche's index number.
c) Fischer's index number. d) None of these.
5. When all the commodities are given equal weightage we get ?
- a) Weighted Index number. b) Fisher's index number.
c) Simple index number d) None of these.
6. Geometric mean of Paasche's Index Number and Laspeyzer's Index Number is :
- a) Marshall-Edgeworth Index number.
b) Kelly's index number .
c) Fischer's index number.
d) None of these.
7. The expected number of children that a woman will bear in her lifetime is called :
- a) Age-specific fertility rate. b) General fertility rate.
c) Total fertility rate. d) None of these.
8. Which is useful to analyse the death by cause ?
- a) Age-specific death rate. b) Cause-specific death rate.
c) Crude death rate. d) None of these.
9. Which among these is an important indicator of maternal health ?
- a) Age-specific fertility rate. b) Maternal mortality rate.
c) Total fertility rate. d) General fertility rate.
10. The approach to probability that defines it as a limit function is :
- a) Classical probability. b) Empirical probability.
c) Subjective probability. d) None of these.
11. When two events A and B are independent ?
- a) $P(A \cap B) = P(A)P(B)$. b) $P(A \cap B) = 0$.
c) $P(A \cap B) = P(A) + P(B)$. d) $P(A \cap B) = 1$.

12. Your intuition of the chance of a rain on a particular day is an example of :
- a) Classical probability. b) Empirical probability.
c) Subjective probability. d) None of these.

(12 × ½ = 6 marks)

Part B (Very Short Questions)

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

13. What is the product rule for differentiation ?
14. What is price elasticity of demand ?
15. Differentiate $y = 58x^2 (3x^2 + 7x - 5)$.
16. What is Splicing ?
17. What is Kelly's Index Number ?
18. What are seasonal variations ?
19. What is crude death rate ?
20. What is maternal mortality rate ?
21. What do you mean by sex ratio ?
22. What are exhaustive events ?
23. What is addition theorem for probability for mutually exclusive events ?
24. Define Sample Space with an example.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

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

25. Differentiate $y = \frac{2x^3 + 7}{3x^2 - 5}$.

26. The total utility function of a consumer who consumes Q units is given by $TU = -3Q^2 + 48Q + 40$.
Find the marginal utility when the consumption is 8 units.

Turn over

27. What is secular trend ?
28. What is time series analysis ? Explain its uses ?
29. What is general fertility rate and specific fertility rate.
30. What is the use of vital statistics ?
31. What is Baye's Theorem ?
32. Explain empirical definition of probability.

(6 × 5 = 30 marks)

Part D (Essay Questions)

Answer any two questions.

Each question carries 12 marks.

33. How maxima and minima are used in Economic analysis ?
34. Examine whether Laspeyer's, Paasche's and Fisher's formulae satisfy factor reversal test using the following data :

Commodity	2005		2008	
	Price	Quantity	Price	Quantity
A	2	3	3	2
B	8	2	9	3
C	5	5	6	5
D	4	2	5	3
E	3	4	4	2

35. Explain different mortality rates.
36. There are 28 girls and 22 boys in a BA class. If two students are selected at random, what is the probability that (i) both are boys ? (ii) Both are girls ? (iii) One is a boy and other is a girl ?

(2 × 12 = 24 marks)



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FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2020

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

Time : Three Hours

Maximum : 80 Marks

Use of Calculator is permitted.

Part A

Answer all questions.

1. $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} = \underline{\hspace{2cm}}$

- (i) 6. (ii) 4.
(iii) 2. (iv) 0.

2. The derivative of 3 with respect to x is $\underline{\hspace{2cm}}$.

- (i) Zero. (ii) 1.
(iii) $3x$. (iv) None of these.

3. If demand function is $20 - 3p + p^2$, then marginal function is $\underline{\hspace{2cm}}$.

- (i) $p - 3$. (ii) $2p - 3$.
(iii) p^2 . (iv) $3p - 3$.

4. First derivative of x^n with respect to x is $\underline{\hspace{2cm}}$.

- (i) nx^n . (ii) $(n - 1)x^n$.
(iii) nx^{n-1} . (iv) None of these.

5. The weights assigned in Laspeyre's price index number are $\underline{\hspace{2cm}}$.

- (i) Current year price. (ii) Base year price.
(iii) Current year quantity. (iv) Base year quantity.

Turn over

6. Dorbish-Bowley Price Index is the _____ of Laspeyre's and Paasche's index.

- (i) AM. (ii) GM.
(iii) HM. (iv) None of these.

7. _____ is the ideal index number.

- (i) Laspeyre's (ii) Paasche's.
(iii) Fisher's. (iv) None of these.

8. Cost of living index number is _____ index.

- (i) Laspeyre's (ii) Paasche's.
(iii) Fisher's. (iv) None of these.

9. (Total live births / Total deaths) is _____.

- (i) Crude birth rate. (ii) Crude death rate.
(iii) Vital index. (iv) None of these.

10. $P(A^C \cap B) =$ _____.

- (i) $P(A) - P(B)$. (ii) $P(B) - P(A \cap B)$.
(iii) $P(B) - P(A)$. (iv) None of these.

11. If A and B are disjoint $P(A \cup B) =$ _____.

- (i) $P(A) - P(B)$. (ii) $P(B) - P(A)$.
(iii) $P(A) + P(B)$. (iv) $P(B) - P(A \cap B)$.

12. $P(A) = 0.5$, $P(B) = 0.4$, if A and B are independent, $P(A \cap B) =$ _____.

- (i) 0.20. (ii) 0.90.
(iii) 1.10. (iv) None of these.

(12 × ½ = 6 marks)

Part B (Very Short Answer Questions)

Answer any ten questions.

13. Find the derivative of $(x^2 - 9)(x^2 + 9)$ with respect to x .
14. Define Marginal Cost.
15. For a demand function $Q = 120 - 10P$, find elasticity of demand.
16. Define Index Numbers.
17. Define Quantity Index Number.
18. Define Paasche's index number.
19. Define Crude Death Rate.
20. Define General fertility rate.
21. Define Sample space.
22. Find $P(A \cap B)$, if $P(A \cup B) = 0.6$, $P(A) = P(B) = 0.4$.
23. Define conditional probability.
24. A box contains 3 white and 5 black balls, 3 balls are drawn. Find the probability that they are one white and 2 black balls.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

Answer any six questions.

25. If $y = x \log x$, show that $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = 0$.
26. Explain marginal revenue, marginal productivity and marginal utility.
27. Explain the uses of index numbers.
28. Explain Laspeyre's and Paache's quantity index numbers.

Turn over

29. Calculate age specific death rate for the following population :

Age	:	0-10	11-24	25-40	41 and over
Population	:	1800	4500	7000	800
No. of deaths	:	30	20	25	15

30. Explain age specific fertility rate and total fertility rate.

31. Define random experiment. Write down the sample space of the random experiment of tossing of three unbiased coins.

32. Given $P(A) = 0.6$, $P(B) = 0.4$, $P(A \cup B) = 0.7$. Find (i) $P(A/B)$; (ii) $P(A/B^C)$; (iii) $P(A^C/B^C)$.

(6 × 5 = 30 marks)

Part D (Essay Questions)

Answer any two questions.

33. Determine the maximum and minimum value of the function $f(x) = x^3 - 6x^2 + 9x - 5$.

34. Calculate (i) Laspeyre's index number; (ii) Paasche's index number using the following data :

Commodity	2004		2008	
	Price (p_0)	Quantity (q_0)	Price (p_1)	Quantity (q_1)
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

35. Calculate crude death rate and standardized death rate using the following data :

Age	:	0-10	11-24	25-40	41-60	61 and over
Population	:	21000	30000	37000	17000	5000
No. of deaths	:	350	102	229	354	415
Std. age distribution/1000		221	298	285	149	47

36. An insurance company insured 3000 scooter drivers, 2000 car drivers and 5000 truck drivers. The probability of accident by the drivers of these types of vehicles is 0.04, 0.02 and 0.03 respectively. One of the insured people meets an accident. What is the probability that he is a truck driver ?

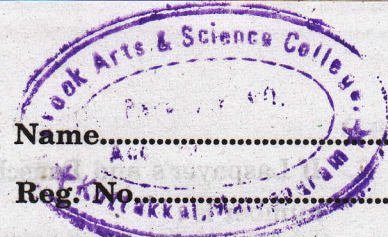
(2 × 12 = 24 marks)

C 61303

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Name.....

Reg. No.....



FOURTH SEMESTER B.A. DEGREE EXAMINATION, APRIL 2019

(CUCBCSS—UG)

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

Time : Three Hours

Maximum : 80 Marks

Use of Calculator is permitted.

Part A

Answer all questions.

1. $\lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x - 2}$, is _____.

(i) - 1.

(ii) 0.

(iii) 1.

(iv) 2.

2. The derivative of $\log x$ with respect to x is _____.

(i) 1.

(ii) x .

(iii) $1/x$.

(iv) 0.

3. If the cost per output is $k = 3x + 18$, then marginal cost when $x = 3$ is _____.

(i) 3.

(ii) 9.

(iii) 27.

(iv) 18.

4. The derivative of $y = 1/x$ with respect to x is _____.

(i) x .

(ii) $-x$.

(iii) $-x^2$.

(iv) $-x^{-2}$.

5. When $TR = 100 - x^2$, the MR is _____.

(i) 100.

(ii) $-2x$.

(iii) $-x^2$.

(iv) None of these.

Turn over

6. If Laspayer's and Paasche's index numbers are calculated as 120 and 124. Then Fisher's index number is :
- (i) 122. (ii) 121.98.
(iii) 123. (iv) None of these.
7. The AM of Laspayer's and Paasche's index numbers is _____ index number.
- (i) Fisher's. (ii) Kelley's.
(iii) Dorbish-Bowley. (iv) Marshal Edgeworth.
8. For an index number satisfying time reversal test $p_{01} \times p_{10} =$ _____.
- (i) 0 (ii) 1.
(iii) 100. (iv) None of these.
9. Number of female children born to 1000 females is _____.
- (i) 1000 TFR. (ii) 1000 NRR.
(iii) 1000 GRR. (iv) 1000 SFR.
10. Two unbiased coins are tossed. P (getting tails on both of the coins) = _____.
- (i) 0.25. (ii) 0.50.
(iii) 0.75. (iv) 1.
11. $P(A) = 0.5$, $P(B) = 0.4$, if A and B are independent, $P(A/B) =$ _____.
- (i) 0.2. (ii) 0.02.
(iii) 0.5. (iv) 0.4.
12. If A and B are mutually exclusive, $P(A \cap B) =$ _____.
- (i) $P(A)$. (ii) $P(A)P(B)$.
(iii) $P(B)$. (iv) None of these.

(12 \times $\frac{1}{2}$ = 6 marks)

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

13. Find the derivative of $\frac{x^2 - 1}{x^2 + 1}$ with respect to x .
14. If $y = 3x^3 + 2x$, find $\frac{d^2 y}{dx^2}$.
15. Define marginal productivity.
16. Find the marginal cost if the total cost is $1000 + 100x - 10x^2 + x^3$.
17. Total revenue function of a firm is $R = 21x - x^2$. Find the marginal revenue when 10 units are sold.
18. Define elasticity.
19. Define splicing.
20. Define fixed base index number.
21. Define Kelley's index number.
22. Define Crude death rate.
23. $P(A) = 0.5, P(B) = 0.4, P(A \cup B) = 0.7$. Verify whether A and B are independent.
24. State addition and multiplication theorem of probability of two events A and B.

 $(10 \times 2 = 20 \text{ marks})$ **Part C (Short Essay Questions)***Answer any six questions.**Each one carries 5 marks.*

25. If $y = e^x(1+x)$, show that $\frac{d^2 y}{dx^2} = e^x + \frac{dy}{dx}$.
26. The cost function $c = a + bx + cx^2$. Obtain marginal cost and average cost functions.

Turn over

27. Explain GRR and NRR.
28. Explain price and quantity index numbers.
29. Write a note on cost of living index number.
30. Explain age specific fertility rate and total fertility rate.
31. Define random experiment. Write down the sample space of the random experiment of tossing of two unbiased dice.
32. Given $P(A) = 0.6$, $P(B) = 0.4$, $P(A \cap B) = 0.3$. Find (i) $P(A \cup B)$; (ii) $P(A^c/B)$; (iii) $P(A^c/B^c)$.

(6 × 5 = 30 marks)

Part D (Essay Questions)

Answer any two questions.

Each one carries 12 marks.

33. The total revenue function for x outputs is given by $R = 3000 - (3 - x)^2$ find the value of x for which R is maximum and the maximum value of R .
34. Calculate (i) Fisher's index number ; (ii) Marshal Edgeworth index number using the following data :

Commodity	2004		2008	
	Price (p_0)	Quantity (q_0)	Price (p_1)	Quantity (q_1)
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

35. Three unbiased coins are tossed. Write the sample space. Find (i) P (getting at least two heads) ; (ii) P (getting at most one head) ; (iii) P (getting exactly two heads) ; (iv) P (getting at least one tail) ; and (v) P (getting all coins of same side).
36. Two boxes contains respectively 2 red, 3 black balls and 3 blue balls; 4 red, 4 black and 2 blue balls. One of the boxes is selected randomly and two balls are drawn. They happened to be 'one red and one blue'. What is the probability that they come from the second box ?

(2 × 12 = 24 marks)

D 42022

(Pages : 4)

Name.....

Reg. No.....

FOURTH SEMESTER B.A. DEGREE EXAMINATION, APRIL 2018

(CUCBCSS—UG)

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

Time : Three Hours

Maximum : 80 Marks

Use of Calculator is permitted.

Part A

Answer all the questions.

1. $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4}$ is :
(a) 8. (b) 4.
(c) 6. (d) 0.
2. The derivative of $y = 5x^4$ with respect to x is :
(a) $20x^3$. (b) $12x^4$.
(c) $20x^5$. (d) $4x^3$.
3. Marginal function is :
(a) Ratio of total function and price. (b) Product of total function and x .
(c) Derivative of the total function. (d) Product of average function and x .
4. For the demand curve $x = 75 - 5p$, the price elasticity of demand at $p = 3$ is :
(a) 2. (b) $\frac{3}{4}$.
(c) 1. (d) $\frac{1}{4}$.
5. The average which is commonly used in index number is :
(a) A.M. (b) G.M.
(c) H.M. (d) Mode.
6. In Laspeyre's index number, the weight is :
(a) Current year quantity. (b) Base year quantity.
(c) Current year price. (d) Base year price.

Turn over

7. Making allowances for the effect of changing price levels is called :
- (a) Splicing. (b) Deflating.
(c) Base shifting. (d) None of these.
8. If in a population of 1000 people, male death is 260 and female death is 140, then CDR is :
- (a) 120. (b) 140.
(c) 260. (d) 400.
9. Fertility mainly depends on :
- (a) Male population. (b) No. of children.
(c) Female population of age 15 – 49. (d) Total female population.
10. The relation between general reproduction rate and net reproduction rate is :
- (a) $NRR \leq GRR$. (b) $NRR > GRR$.
(c) $NRR / GRR > 1$. (d) $GRR / NRR = 0$.
11. If A and B are independent events and $P(A) = 0.5$, $P(B) = 0.3$, then $P(A \cup B)$ is :
- (a) 0.8. (b) 0.15.
(c) 0.7. (d) 0.65.
12. The probability of getting a multiple of 2 or 4, in a throw of a die is :
- (a) $\frac{1}{2}$. (b) $\frac{4}{6}$.
(c) $\frac{1}{6}$. (d) 1.

(12 × ½ = 6 marks)

Part B (Very Short Answer Questions)

Answer any ten questions.

13. Find the derivative of $y = x^3 + 2x^2 + 6$ with respect to x .
14. Define marginal revenue function.
15. Define continuity of a function ?
16. Define index numbers.
17. What is meant by BSE SENSEX ?
18. Define Paasche's index number.

19. What are the sources of vital statistics ?
20. Define specific death rate.
21. Define sex ratio.
22. Define sample space.
23. Define equally likely events.
24. An unbiased die is thrown two independent times. Given that the first throw resulted in an odd number. Find the probability that the sum obtained is 6.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

Answer any six questions.

25. Differentiate $\frac{(3x+1)^2}{x-2}$ with respect to x .
26. Find the maximum profit that a company can make, if the profit function is given by $p(x) = 40 - 20x - 12x^2$.
27. The revenue function is $R = 14x - x^2$ and the cost function is $T = x(x^2 - 2)$. Find the marginal functions.
28. What are the properties to be satisfied by an index number ? Verify that Fisher's index number satisfies the properties.
29. Explain about vital statistics and vital records.
30. Distinguish between NRR and GRR.
31. Describe the terms mutually exclusive events and independence of events. Give examples for each of them.
32. If a card is drawn from a pack of playing cards, then find the probability of getting a (i) spade, (ii) king or queen.

(6 × 5 = 30 marks)

Part D (Essay Questions)

Answer any two questions.

33. Given a firm's demand function $x - 90 + 2p$ and its cost function $AC = x^3 - 8x^2 + 57x + 2$. Find the level of output which (i) maximizes total revenue, (ii) minimizes marginal costs ; and (iii) maximizes profit.

Turn over

34. Calculate Fisher's index number from the following data and check whether Fisher's ideal index number satisfies all the tests

Commodities	1980		1990	
	Price	Quantity	Price	Quantity
A	5	50	6	54
B	8	16	8	20
C	3	30	4	32
D	10	40	12	60
E	12	60	15	96

35. Calculate (i) GFR, (ii) SFR, (iii) TFR and (iv) general reproduction rate from the following data :

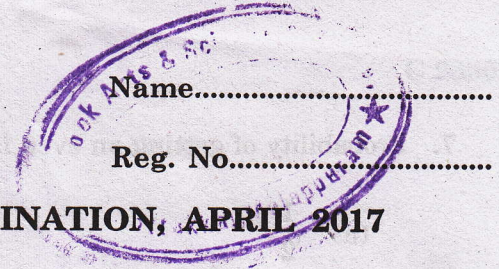
Age group of child bearing females	}	:	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
Number of women ('000)			16	16.4	15.8	15.2	14.8	15	14.5
Total births	:	260	2244	1894	1320	916	280	145	

36. A bag contains 4 white balls, 3 red balls and 3 blue balls. Three balls are drawn at random. Find the probability that the drawn balls are (i) 2 white and a blue ball, (ii) at least one ball of each colour.

(2 × 12 = 24 marks)

C 23357

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FOURTH SEMESTER B.A. DEGREE EXAMINATION, APRIL 2017

(CUCBCSS—UG)

Economics

ECO 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions.

Each question carries ½ mark.

1. The geometric mean of Laspeyre's index and Paasche's index is :

- (a) Rao's index.
- (b) Fisher's index.
- (c) Marshall's index.
- (d) Pascal's index.

2. Which of the following is an example of convex function for $x \in \mathbb{R}$?

- (a) x^2 .
- (b) $12x + 3$.
- (c) $\frac{1}{x}$.
- (d) $\log x$.

3. Factor reversal test was suggested by :

- (a) Fisher.
- (b) Rao.
- (c) Freund.
- (d) Williams.

4. Making allowances for the effect of changing price levels is called :

- (a) Splicing.
- (b) Deflating.
- (c) Base shifting.
- (d) None of these.

5. Marginal cost is the derivative of :

- (a) Average cost.
- (b) Cost function.
- (c) Elasticity of demand.
- (d) Price elasticity.

6. The second order derivative of $x^3 + 2x$ is :

- (a) $6x$.
- (b) 6.
- (c) $3x^2$.
- (d) None of these.

Turn over

7. Probability of getting an even face when a die is thrown is :
- (a) $\frac{1}{2}$. (b) $\frac{1}{6}$.
- (c) $\frac{1}{3}$. (d) $\frac{2}{3}$.
8. Which of the following is true about NRR and GRR ?
- (a) $NRR \leq GRR$. (b) $NRR < GRR$.
- (c) $GRR > NRR$. (d) $GRR \geq NRR$.
9. The term associated to the value of one season expressed as a percentage of the preceding other :
- (a) Deseasonalisation. (b) Seasonalisation.
- (c) Link relative. (d) Random component.
10. The arithmetic mean of Laspeyre's index and Paasche's index is _____.
- (a) Fisher's index. (b) Rao's index.
- (c) Marshall's index. (d) None of these.
11. If A and B are independent events, then $P(A \cap B)$:
- (a) $P(A)P(B)$. (b) $P(A) + P(B)$.
- (c) $P(A) + P(B) - P(A \cap B)$. (d) None of these.
12. In ratio to trend method, seasonal variation for any given month is constant factor of :
- (a) Trend. (b) Seasonal components.
- (c) Cyclic components. (d) Random component.

(12 \times $\frac{1}{2}$ = 6 marks)

Section B (Very Short Answer Questions)

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

13. When does limit of a function exist ?
14. Write the working procedure to obtain the maxima of a function.
15. What is meant by Laspeyre's index number ?
16. What is a time series model ?

17. Give any *four* examples of Vital Statistics.
18. State the classical definition of probability
19. What do you mean by Crude birth rate ?
20. Give any *two* methods for measuring seasonal index.
21. State any *two* applications of derivatives in Economics.
22. Define curvature.
23. What are chain base index numbers ?
24. What is the probability that a leap year contains 53 Sundays ?

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)

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

25. What is meant by consumer price index ? What are its uses ?
26. What is meant by (i) Couple protection ratio ; (ii) Infant mortality rate.
27. Discuss the merits and demerits of trend fitting by principle of least squares.

28. A firm produces x units of output per week at a total cost of Rs. $\left(\frac{x^3}{3} - x^2 + 5x + 3\right)$.

Find the level at which the marginal cost and the average cost attain their respective minima.

29. Explain the following terms associated with Index numbers: (i) Base shifting ; (ii) Splicing.
30. Describe the uses of Vital Statistics
31. State addition theorem and multiplication theorem in probability.
32. Write short notes on BSE-SENSEX and NSE-NIFTY.

(6 × 5 = 30 marks)

Section D (Essay Questions)

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

33. Describe the components of Time series model
34. (a) Convert the following fixed base index numbers in to chain base index numbers.

Year	:	1990	1991	1992	1993	1994	1995
FBI	:	376	392	408	380	392	490

Turn over

(b) Calculate the cost of living index from the following data :

Items	Price		Weight
	Base year	Current year	
Food	30	47	4
Fuel	8	12	1
Clothing	14	18	3
House rent	22	15	2
Miscellaneous	25	30	1

35. Discuss the problems involved in the construction of index numbers

36. (a) Explain the following : (i) Specific fertility rate ; (ii) GRR and NRR.

(b) Explain : (i) Joint probability ; and (ii) Marginal probabilities.

(2 × 12 = 24 marks)

C 5211

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Name.....

Reg. No.....

**FOURTH SEMESTER B.A. DEGREE (SUPPLEMENTARY/IMPROVEMENT)
EXAMINATION, MAY 2016**

(UG—CCSS)

Core Course—Economics

EC 4B 05—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

(2013 Admissions)

Time : Three Hours

Maximum : 30 Weightage

I. Objective type questions. Answer all *twelve* questions.

1 If a, b, c, d are in arithmetic progression then $ad =$ _____.

2 $\log_e e^2 =$ _____.

3 $2 + 4 + 6 + \dots + 2n =$ _____.

4 If A is any set, then $A \cup \phi =$ _____.

5 $f(x) = x^2 + 25$ is an odd function in x . State true or False.

6 Slope of the line $y = 4x - 5$ is _____.

7 If $\frac{x}{3} + \frac{3}{x} = 2$, then $x =$ _____.

8 Matrix multiplication is always commutative. State true or False.

9 If A is a matrix of order 3×2 then the order of A^T is _____.

10 $\begin{vmatrix} a & a \\ b & b \end{vmatrix} =$ _____.

11 $\lim_{x \rightarrow a} \frac{x^4 - a^4}{x - a} =$ _____.

12 $\frac{d^2x}{dx^2} =$ _____.

(12 \times $\frac{1}{4}$ = 3 weightage)

Turn over

II. Short answer type questions. Answer all *nine* questions :

- 13 If $\log_{10} 2 = 0.3010$ and $\log_{10} 3 = 0.4771$, find the value of $\log_{10} 6$.
- 14 Find the harmonic mean of 6, 10.
- 15 Define power set.
- 16 Define function.
- 17 Find the equation of a straight line having slope $2/3$ and passing through the point (1, 1).
- 18 Distinguish between singular and non-singular matrix.
- 19 Define skew symmetric matrix.
- 20 Differentiate the $e^{-x} \log x$ with respect to x .
- 21 If $z = xy + 7$, find $\frac{\partial^2 z}{\partial x \partial y}$.

(9 × 1 = 9 weightage)

III. Short essay or paragraph questions. Answer any *five* questions :

- 22 Find three numbers in arithmetic progression whose sum is 12 and the sum of whose squares is 56.
- 23 Find the equilibrium price and quantity if $x = 25 - 3p$ and $x = 2p + 10$ respectively denote the demand and supply curves.
- 24 Solve the equation $\log(x^2 - 9) - \log(x - 9) = \log 16$.
- 25 State the properties of determinants.
- 26 Find the minimum value of the function $f(x) = x\sqrt{x+1}$.
- 27 Define homogeneous function state Euler's theorem.
- 28 Find the points of inflexion of the curve $y = (\log_e x)^3$.

(5 × 2 = 10 weightage)

IV. Essay questions. Answer any *two* questions :

- 29 Solve the following equations by Cramer's rule

$$3x + 3y - z - 11 = 0, 2x - y + 2z - 9 = 0, 4x + 3y + 2z - 25 = 0.$$

- 30 If $A = \begin{bmatrix} 7 & -11 & 16 \\ -3 & 5 & -7 \\ 1 & -2 & 3 \end{bmatrix}$, find A^{-1} . Verify that $AA^{-1} = I$.

- 31 If $z = x^3 - y^3 + 3x^2y$ show that $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 3z$.

(2 × 4 = 8 weightage)