



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF BUSINESS, ECONOMICS AND ACCOUNTING

DEPARTMENT OF ECONOMICS AND BUSINESS SCIENCES

EXAMINATION PAPER

COURSE CODE : CBM103 ;
COURSE TITLE : QUANTITATIVE ANALYSIS FOR BUSINESS
DURATION : 3 Hours
DATE :

INSTRUCTIONS TO CANDIDATES:

1. No cell phones are allowed in the examination venue.
2. Answer any **FOUR (4)** questions.
3. Begin each question on a new page.
4. The number of marks for each question or part question is shown in brackets []

QUESTION ONE

a) Briefly write notes on the following terms:

- i) Random sampling methods (3 marks)
- ii) Quasi random sampling methods (3 marks)
- iii) Non-random sampling methods (3 marks)

b) Past experience has shown that for every 100,000 items produced in a plant by the morning shift, 200 are defective, and for every 100,000 items produced by the evening shift, 500 are defective. During a 24-hour period, 1000 items are produced by the morning shift and 600 by the evening shift. What is the probability that an item picked at random from the total of 1600 items produced during the 24-hour period:

- i) Was produced by the morning shift and is defective? (4 marks)
- ii) Was produced by the evening shift and is defective? (4 marks)
- iii) Was produced by the evening shift and is *not* defective? (4 marks)
- iv) Is defective, whether produced by the morning or the evening shift? (4 marks)

QUESTION TWO

Table below gives the frequency distribution of gasoline prices frequency for petrol prices at 48 stations in a town.

Price (\$)	Frequency
1.00-1.04	4
1.05-1.09	6
1.10-1.14	10
1.15-1.19	15
1.20-1.24	8
1.25-1.29	5

a) Present the data in the form of:

- i) An absolute frequency histogram (3 marks)
- ii) An ogive. (3 marks)

b) Calculate the following for the frequency distribution of petrol prices:

- i. Mean (2 marks)
- ii. Mode (2 marks)
- iii. Range (1 mark)
- iv. Quartile deviation (4 marks)
- v. Standard deviation. (3 marks)
- vi. Coefficient of variation (1 mark)
- vii. Pearson coefficient of skewness and comment (3 marks)
- viii. Coefficient of kurtosis and comment (3 marks)

QUESTION THREE

- a) A government agency receives many consumer complaints that the boxes of detergent sold by a company contain less than the 20 grams of detergent advertised. To check the consumers' complaints, the agency purchases 9 boxes of the detergent and finds that $\bar{X} = 18$ grams and $s = 3$ grams. How can the agency conduct the test at the 5% level of significance if it knows that the amount of detergent in the boxes is normally distributed? (12 marks)
- b) Either coal (C) or gas (G) can be used in the production of steel. The cost of coal is \$4100, the cost of gas is \$500.
- c) Draw an isocost curve showing the different combination of gas and coal that can be purchased with the initial expenditure (E) of \$10000. (4 marks)
- d) Draw an isocost curve showing the different combination of gas and coal that can be purchased:
- i) If expenditures increase by 50% (3 marks)
 - ii) If the price of gas is reduced by 20% (3 marks)
 - iii) If the price of coal rises by 25% (3 marks)

QUESTION FOUR

a) The following data gives quarterly sales figures of textiles from 2014-2018. The sales are in thousand dollars.

Year	Q ₁	Q ₂	Q ₃	Q ₄
2014	78	62	56	71
2015	84	64	61	82
2016	92	70	63	85
2017	100	81	72	96

Calculate the trend using the 4-point moving average method and show both the data and trend line on a histogram. (20 marks).

b) Maximize the following total revenue (TR) function, $TR = 32Q - Q^2$, by,

- Finding the critical value (s)
- Testing the second order condition
- Calculate the maximum TR (5 marks)

QUESTION FIVE

a) In a certain region there is a large number of older trees where the group is marshy but very few where the group is dry. The number (x) of older trees and the group moisture content (y) are found in each of ten equal areas. The following is a summary of the results of the survey:

$$\sum x = 500, \quad \sum y = 300, \quad \sum x^2 = 27\,818, \quad \sum xy = 16\,837, \quad \sum y^2 = 10\,462$$

- Find the equation of the regression line (10 marks)
 - Using the result obtained in (i), estimate the ground moisture content in an area equal to one of the chosen areas which contains 60 older trees. (1 mark)
- b) A debt of \$60,000 is to be repaid through amortization over 2 years. The rate of interest is 12% per annum compounded quarterly.
- Calculate the quarterly payment applicable (3 marks)
 - Draw up the amortization schedule (8 marks)
 - Indicate the capital and interest portion of the 5th payment (3 marks)

END OF EXAMINATION