

**ZIMBABWE EZEKIEL GUTI UNIVERSITY**



**FACULTY OF COMMERCE**

**CBM103: QUANTITATIVE ANALYSIS FOR BUSINESS**

**TIME: THREE HOURS**

**5 DECEMBER 2018**

**INSTRUCTIONS:**

1. Answer any FOUR questions
2. All questions carry equal marks
3. Merit is most awarded when you answer to the best of your ability giving any diagrams, examples or indicators as might be necessary.
4. Calculators are allowed
5. Cell phones are NOT allowed

### QUESTION ONE

a) Explain the advantages and disadvantages of following sampling techniques:

- i) Judgmental (2 marks)
- ii) Simple random (2 marks)

b) The table below gives the frequency distribution of family incomes for a sample of 100 families in a city.

Family income (\$)	Frequency
10000-11999	12
12000-13999	14
14000-15999	24
16000-17999	15
18000-19999	13
20000-21999	7
22000-23999	6
24000-25999	4
26000-27999	3
28000-29999	2

Calculate the following for the frequency distribution of family incomes:

- i. Mean (2 marks)
- ii. Median, (2 marks)
- iii. Mode (2 marks)
- iv. Range (1 mark)
- v. Quartile deviation (4 marks)
- vi. 45<sup>th</sup> percentile (2 marks)
- vii. 3<sup>rd</sup> decile (2 marks)
- viii. Variance (2 marks)
- ix. Pearson coefficient of skewness (2 marks)
- x. Coefficient of kurtosis (2 marks)

## QUESTION TWO

- a. For covariance, in what range should the covariance for:
- i. Directly related data fall? (1 mark)
  - ii. Inversely related data fall? (1 mark)
  - iii. Unrelated data fall? (1 mark)
- b. Experience indicates that an average of 6 customers per hour stop for Chicken Inn at Mvuma Shopping Centre.
- i. What is the probability of 3 customers stopping in any hour? (3 marks)
  - ii. What is the probability of 3 customers or less in any hour? (3 marks)
  - iii. What is the expected value, or mean for this distribution? (2 marks)
  - iv. What is the standard deviation for this distribution? (2 marks)
- c. Peter took out a \$100 000 loan from a bank over a four-year period at an interest of 28% per annum compounded quarterly. After 2½ years, interest rate reduced to 24% per annum compounded quarterly.
- i. If his payments were made at the end of each three months, how much did Peter owe at the end of the first 2½ years? (6 marks)
  - ii. What were his quarterly repayments for the remaining 1½ years? (6 marks)

## QUESTION THREE

- a) Given the following set of simultaneous equations for two related markets, beef (B) and Pork (P), find the equilibrium conditions for each market.
- i)  $Q_{dB} = 82 - 3P_B + P_p$   
 $Q_{sB} = -5 + 15P_B$
  - ii)  $Q_{dP} = 92 + 2P_B - 4P_P$   
 $Q_{sP} = -6 + 32P_P$  (5 marks)

b) A property analyst is examining the relationship between the city council's valuation on residential property and the market value (selling prices) of properties. A random sample of 8 recent property transactions was examined. The data is as follows:

City council valuation	Market Value
12	65
45	220
32	142
50	310
28	196
56	364
18	116
40	260

Find the correlation coefficient between council valuations and market values. Comment your answer. (20 marks)

#### QUESTION FOUR

a) Solve the following equation:

$$5x^2 + 23x + 12 = 0$$

(3 marks)

b) Given the following total revenue function,  $TR = 1400Q - 6Q^2$  and total cost function,  $TC = 1500 + 80Q$ , maximize profit  $\pi$  for the firm as follows:

i) Set up the profit function  $\pi = TR - TC$  (2 marks)

ii) Find the critical values (s) where  $\pi$  is at a relative extremum and test the second order condition (4 marks)

iii) Calculate the maximum profit. (4 marks)

c) Assume that family incomes are normally distributed with  $\mu = \$16,000$ , and  $\sigma = \$2000$ . What is the probability that a family picked at random will have an income:

i) Between \$15,000 and \$18,000? (4 marks)

ii) Below \$15,000? (4 marks)

iii) Above \$18,000? (4 marks)

### QUESTION FIVE

- a) Briefly explain the four components of time series. (8 marks)
- b) Enrolment for students in a certain programme offered by ZEGU between 2010 and 2018 was as follows:

Year	No. of students
2010	71
2011	62
2012	56
2013	75
2014	78
2015	69
2016	72
2017	76
2018	80

Forecast the number of students who are likely to be enrolled in year 2020 using the least squares method. (17 marks)

**\*\*\*END OF EXAMINATION\*\*\***