



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 : 4 June 2019

**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 I

- a. Residents in one housing development were asked a series of questions by their homeowners' association. Identify the type of data for each question.
- Did you play golf during the last month on the development's new golf course? [1 mark]
  - How many times have you eaten at the country club restaurant during the last month? [1 mark]
  - Do you own a camper? [1 mark]
  - Rate the new security system for the development (very good, good, poor, or very poor). [1 mark]
- b. Groupon, an online Website, offers its subscribers at least one special deal per day to local businesses in their cities such as places to eat, health-related activities (spas or fitness centres), places to see (museums), and a variety of activities such as golfing or sky diving, or other specials. From a survey of students at one university during the past week, a random sample of Groupon purchases by the university students was obtained by gender as follows:

Type of purchase	Male	Female	Total
Activities	140	90	230
Food	45	35	80
Health related	20	70	90
Other	10	40	50
<b>Total</b>	<b>215</b>	<b>235</b>	<b>450</b>

Graphically depict the type of purchase by gender with a component bar chart. [10 marks]

- c. Consider the following frequency distribution for a sample of 46 observations:

Class	Frequency
1-3	9
4-7	8

8–14	7
15–17	12
18–22	10

Find the class widths and frequency densities.

[6 marks]

Draw a histogram to represent the data.

[5 marks]

### QUESTION 2

a. A manager has a pool of 8 employees who could be assigned to a project-monitoring task. 4 of the employees are women and 4 are men. 2 of the men are brothers. The manager is to make the assignment at random so that each of the 8 employees is equally likely to be chosen. Let  $A$  be the event “chosen employee is a man” and  $B$  the event “chosen employee is one of the brothers.”

i. Find the probability of  $A$ .

[2 marks]

ii. Find the probability of the intersection of  $A$  and  $B$ .

[4 marks]

b. Customers arrive at a busy checkout counter at an average rate of 3 per minute. If the distribution of arrivals is Poisson, find the probability that in any given minute there will be 2 or fewer arrivals.

[4 marks]

c. A manufacturer of detergent claims that the contents of boxes sold weigh on average at least 16 ounces. The distribution of weight is known to be normal, with a standard deviation of 0.4 ounce. A random sample of 16 boxes yielded a sample mean weight of 15.84 ounces.

Test at the 10% significance level the null hypothesis that the population mean weight is at least 16 ounces.

[15 marks]

### QUESTION 3

Abdul Hassan, president of Floor Coverings Unlimited, has asked you to study the relationship between market price and the tons of rugs supplied by his competitor, Best Floor, Inc. He supplies you with the following observations of price per ton and number of tons, obtained from his secret files:

Price (X)	Quantity (Y)
2	5
4	10
3	8

6	18
3	6
5	15
6	20
2	4

- a. Prepare a scatter plot. [3 marks]
- b. Compute the regression equation [8 marks]
- c. Write a short explanation of the regression equation that tells Abdul how the equation can be used to describe his competition. [4 marks]
- d. Compute the coefficient of determination. [3 marks]
- e. Compute the correlation coefficient. [3 marks]
- f. Using your answers for part d and e, briefly discuss the relationship between market price and the tons of rugs supplied. [4 marks]

#### QUESTION 4

- a. A farmer purchased a John Deere combine for \$369,930. The equipment dealership sets up a financing plan to allow for end-of-quarter payments for the next two years at 7.8% compounded monthly. Construct a complete amortization schedule and calculate the total interest. [12 marks]
- b. Solve the following equation:  $9(3x+4) - 2x = 11 + 5(4x-1)$  [2 marks]
- c. The equilibrium conditions for two markets, butter and margarine, where  $P_b$  and  $P_m$  are the prices of butter and margarine, respectively are given below:

$$8P_b - 3P_m = 7$$

$$-P_b + 7P_m = 19$$

Calculate the prices that will bring equilibrium to the model. [3 marks]

Find (1) the marginal and (2) the average functions for each of the following total functions and evaluate them at  $Q = 3$

i.  $TC = 35 + 5Q - 2Q^2 + 2Q^3$  [4 marks]

ii.  $TR = 12Q - Q^2$  [4 marks]

### QUESTION 5

The following are sales of electric heaters in thousand units

Year	Quarters			
	1	11	111	1V
2017	20	26	43	57
2018	15	21	43	68
2019	15	32	45	73

By means of moving average, forecast the first and second quarters of 2020. [25 marks]