



CHARTERED INSTITUTE OF BANKERS (GHANA)

ASSOCIATESHIP EXAMINATION

LEVEL II

**QUANTITATIVE METHODS FOR DECISION-MAKING
JULY 2020**

N.B:

1. Read carefully the instructions on the cover of the answer book.
2. Answer any FOUR (4) questions. Marks for subdivisions of questions are shown in brackets.
3. Each question carries 25 marks.
4. No books, dictionaries, notes or any other written materials are allowed in this examination.
5. Calculators, including scientific calculators are allowed provided they are not programmable and cannot store or recall information. Electronic calculators and personal organizers are not allowed. All workings should be shown.
6. Materials provided:
 - Formulae sheet and tables for the Normal and Chi-Squared distributions
 - Graph sheets
7. Time allowed: THREE (3) HOURS.
8. Candidates must ensure that they answer questions in the appropriate answer book and NOT on loose sheets which are supplementary sheets. Such answers will not be marked.
9. DO NOT WRITE YOUR NAME ON THE ANSWER BOOK.
10. DO NOT OPEN THIS QUESTION BOOK UNTIL YOU HAVE BEEN INSTRUCTED TO DO SO.

ANSWER ANY FOUR QUESTIONS

QUESTION ONE

A new commercial bank which has recently acquired license to operate as a bank in Ghana has developed a new product to position itself in the banking industry as a relevant player. It believes in a blue ocean strategy by creating its own market space to make competition irrelevant. As a marketing manager for the new bank, you have been asked to conduct a feasibility study of the new product. Management of the bank must make a decision with respect to the sales volume and ancillary resources that must be used to market this product for the ensuing year.

The least expensive decision alternative (d_1) is to start selling the new product through existing sales channels and provide customer support as needed. The next alternative (d_2) is to assign one full-time sales person to focus on this product. The third alternative (d_3) is to have a team of six people dedicated to this product. Finally, a complete division (d_4) consisting of about twelve people may be created to fully automate the product and engage in an extensive marketing campaign.

The potential profit from each decision alternative depends on the market acceptance or demand for this product which may be high, moderate or low depending on the circumstance. If market acceptance is high, each of the four decision alternatives, d_1 through d_4 will produce a profit of -200, 0, 300, and 900 thousand dollars respectively. If there is a moderate demand, the profits are likely to be 100, 100, 200, and -200 thousand dollars respectively. If the demand turns out to be low, then the profits will be 200, 150, -200 and -500 thousand dollars respectively. Anecdotal research in the banking industry suggests that with such products provides a probability estimate of demand to be high, moderate and low as 0.3, 0.5 and 0.2 respectively.

- a) Which of the four decision alternatives should be selected by the bank and what will be the expected profit from this decision? **(7 marks)**
- b) If a market research firm can provide perfect information about demand to the new bank (i.e. whether it will be high, moderate, or low) before a product launching decision is made, how much is that information worth to the new bank? **(7 marks)**
- c) Define the complement rule of probability. **(5marks)**
- d) Discuss the implications of making decisions under conditions of uncertainty. **(6marks)**

(Total marks:

25)

QUESTION TWO

The Human Resource Manager of a bank was worried about the number of international training programmes attended by the staff every year(x) and the corresponding allowances ($GHCy$). A random sample of training 10 programmes gave the following results:

x (days)	10	3	8	17	5	9	14	16	21	13
Staff Allowance(y) (GH¢)	116	39	85	159	61	94	143	178	225	134

- (a) Find an equation of the regression line of Y on X in the form $Y = a + bX$. (10 marks)
- (b) Interpret the slope b and intercept a of your line. (5marks)
- (c) Find the expected allowance to be paid for a training programme that lasted for 11 days (5marks)
- (d) State and give a reason, whether or not you would use the line to find the expected training lasting for 2 months. (5marks)

(Total marks: 25)

QUESTION THREE

A bank had to write off the following bad debts for the years 1990 – 1996 inclusive.

Year	Amount of bad debts (GH¢000)
1990	360
1991	390
1992	440
1993	500
1994	560
1995	600
1996	650

- (a) Find the trend using the method of moving average. (10 marks)
- (b) Using the data above, plot a histogram showing the trend line calculated in (a) above. (5marks)
- (c) Accurate bank sales and profit forecasting requires careful analysis of a bank's specific and broader influences. Discuss some of the micro and macro-economic factors a bank must analyse in its sales and profit forecasting. (5marks)

(d) Forecasting the success of new product in the banking industry is notoriously difficult. Describe some of the macroeconomic and microeconomic factors that a bank might consider in forecasting sales for new products. **(5 marks)**
(Total marks: 25)

QUESTION FOUR

The demand and supply functions are given below:

a) $P = 900 - 0.5Q$ and $P = 300 + 0.25Q$. What is the equilibrium price and quantity?
(10marks)

The table below shows the quantity of products supplied and demanded per week in Kaneshie market.

Quantity Demanded	Quantity supplied	Price
8	37	10
10	35	8
15	30	7
18	28	6
25	25	5
26	22	4
30	18	3
32	15	2
35	10	1

b) Graphically determine the equilibrium point, explaining the circumstances under which there will be excess demand and supply. **(15 marks)**

(Total marks: 25)

QUESTION FIVE

For your next presentation to the management team of your bank, you have been asked to explain the following:

(a) Explain, with reference to index numbers, any four of the following:

(i) Indices numbers - their uses and construction.

(5 marks)

- (ii) A expenditure index. (3 marks)
- (iii) A price index. (3 marks)
- (iv) The base period. (3 Marks)
- b. i) The key elements of a time series. (5 Marks)
- (ii) The uses of a time series for forecasting. (6 Marks)

(Total marks: 25)

QUESTION SIX

Agorwu Company produces office chairs. The price per chair is GH¢99.75 and the variable cost per chair is GH¢49.75. The following fixed costs are incurred:

Depreciation of plant and equipment per year	GH¢20,000
Property taxes per year	GH¢ 12,000
Manager's salary and fringe benefits per month	GH¢ 5,200

Perform a breakeven analysis of this company:

- a. What is the total revenue function? (2 marks)
- b. What is the total cost function? (2marks)
- c. What is the profit function? (2marks)
- d. What is the breakeven point in number of chairs? (2marks)
- e. What is the revenue at the breakeven point? (2marks)
- f. What is the income at the breakeven point? (2marks)
- g. Determine the profit when 1,500 chairs are produced in a year. (8marks)
- h. How many chairs must be sold for the company to make GH¢75, 000 in a year?
(5marks)

(Total marks: 25)