

THE PUBLIC ACCOUNTANTS EXAMINATIONS BOARD

A Committee of the Council of ICPAU

ATC(U) EXAMINATIONS

LEVEL ONE

BUSINESS MATHEMATICS & STATISTICS – PAPER 3

WEDNESDAY, 20 JUNE 2012

INSTRUCTIONS TO CANDIDATES

1. Time allowed: **3 hours 15 minutes**.
The first 15 minutes of this examination have been designated for reading time. You may not start to write your answer during this time.
2. This examination contains Sections **A**, **B** and **C**.
3. Section **A** is bound separately from Sections **B** and **C**.
4. Attempt all the 20 multiple choice questions in Section **A**. Each question carries $1\frac{1}{2}$ marks.
5. Attempt **two** of the **three** questions in Section **B**. Each question carries 20 marks.
6. Attempt **two** of the **three** questions in Section **C**. Each question carries 15 marks
7. Write your answer to each question in a separate answer booklet.
8. Please, read further instructions on the answer book before attempting any question.

SECTION B

Attempt two of the three questions in this section

Question 2

- (a) (i) What is the name that describes sets A and B where $n(A \cap B) = 0$?
 (ii) Draw a Venn diagram to illustrate sets A and B in (a) (i) above. **(3 marks)**
- (b) The price of a house was Shs 8 million. After paying Shs 2 million, the buyer secured the balance with a loan from a bank. The loan was to be paid in equal monthly installments for 4 years. The interest rate charged is 6% per annum compounded yearly.

Required

Find the amount of each installment.

(5 marks)

- (c) Mr. Omoding made a profit of Shs 200,000 from his business. His expenditure was as follows:

Furniture	30%
Clothing	20%
Power	15%
Recreation	10%
Savings	25%

Required:

- (i) Determine the amount of money spent on each. **(5 marks)**
 (ii) Construct a pie chart to represent his expenditure .

(7 marks)

(Total 20 marks)

Question 3

- (a) Goods costing Shs 400,000 were sold at a gross profit of 30%. If the net profit was Shs 77,000 find the value of the operating costs. **(4 marks)**
- (b) The following frequency distribution shows a summary of 65 customer satisfaction ratings for a consumer product:

Satisfaction Rating	Frequency
36 – 38	4
39 – 41	15
42 – 44	25
45 – 47	19
48 – 50	2

Required

Calculate the mean satisfaction rating.

(5 marks)

- (c) The demand equation for a firm's product is given by $P = -5Q + 3,000$, and its total cost equation is given by $TC = 50Q + 10,000$, where Q is the quantity produced and sold, P is the profit and TC is the total cost. All values are in shillings and quantities in kilograms.

Required:

Determine the:

- (i) quantity that maximizes revenue.
- (ii) quantity and price that maximize profits.
- (iii) maximum profit.

(4 marks)

(5 marks)

(2 marks)

(Total 20 marks)

Question 4

- (a) Give **four** characteristics of a good questionnaire.

(4 marks)

- (b) Distinguish between range and mean deviation.

(2 marks)

- (c) A group of 30 students scored the following marks in a coursework:

15	11	8	13	5	10
18	14	13	15	6	2
3	8	16	14	8	10
5	13	6	9	15	7
17	11	4	10	16	15

Required:

- (i) Set up a grouped frequency distribution table starting with class (0 – 4).

(4 marks)

- (ii) Use the frequency table to prepare a bar chart.

(3 marks)

- (d) The output of maize flour, in tonnes, of six companies in a certain week were 118, 135, 128, 137, 124 and 132

Required:

Determine their:

- (i) range

(2 marks)

- (ii) mean deviation

(5 marks)

(Total 20 marks)

SECTION C

Attempt two of the three questions in section

Question 5

- (a) State each of the following phrases as a finite set, an infinite set or an empty set:
- (i) The students enrolled on the ATC course.
 - (ii) Positive integers less than zero.
 - (iii) The values of x and y satisfying the equation $x + y = 10$.
 - (iv) Letters in the word "TECHNICIANS".
- (4 marks)**
- (b) In a group of 50 students, 30 students had ever banked money with bank A, 23 with bank B, 25 with bank C. 3 students had never banked with any of these banks. 8 had ever banked with banks A and B, 11 with B and C while 19 with banks A and C.

Required:

- (i) Represent the above information on a Venn diagram.
- (7 marks)**
- (ii) Find the number of students who had ever banked with all the three banks.
- (2 marks)**
- (iii) Find the number of students who had ever banked with exactly two banks.

(2 marks)

(Total 15 marks)

Question 6

- (a) What is meant by equal matrices? (2 marks)

- (b) Given matrices $A = \begin{pmatrix} 2 & 4 \\ 3 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -2 \\ 5 & 8 \end{pmatrix}$,

Required:

- (i) Find the result of subtracting B from A. (2 marks)

- (ii) Find the product BA. (2 marks)

- (iii) Determinant of matrix BA. (2 marks)

- (c) A company employs technicians and office messengers. By employing 3 technicians and 4 office messengers, its weekly wage bill is Shs 800,000. But its weekly wage bill becomes Shs 300,000 when it employs 1 technician and 2 office messengers.

Required:

Find the weekly pay for each technician and each office messenger.

(7 marks)

(Total 15 marks)

Question 7

- (a) State **five** important factors considered when constructing an index number.

(5 marks)

- (b) The following table shows unit prices and quantities of a certain commodity from 1995 to 1998.

Year	Sales	Unit price
1995	1714	1830
1996	1762	1997
1997	1853	2050
1998	1828	2178

Required:

Use 1995 as a base year to construct a simple relative:

- (i) price index for the years. (3 marks)

- (ii) value index for the years. (7 marks)

(Total 15 marks)