INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS OF RWANDA
Driving Sustainable Performance

Associate of IFAC

CERTIFIED ACCOUNTING TECHNICIAN

LEVEL 1 EXAMINATION

L1.4: BUSINESS MATHEMATICS

WEDNESDAY: 10 JUNE 2015

INSTRUCTIONS:

1. **Time Allowed: 3 hours 15 minutes** (15 minutes reading and 3 hours writing).
2. This examination has **seven** questions and only **five** questions are to be attempted.
3. Marks allocated to each question are shown at the end of the question.
4. Show all your workings.

QUESTION ONE

a) Distinguish between linear and quadratic functions **(4 Marks)**

b) State four importance of functions in business **(4 Marks)**

c) At selling price of Frw 400 per unit, the expected sales of a product would be 10,000 units, but sales would fall to 8,000 units if the selling price rose to Frw 500. The demand function is a linear function.

The total function is

$C(x) = 150{,}000 + 18x$

Where: x is the number of units.

REQUIRED:

i) Determine the demand function **(4 Marks)**

ii) Determine the profit function **(3 Marks)**

d) The demand for oranges in local market is 4,000 units when the unit price is Frw 1,000 and 4,800 units when unit price is Frw 800

REQUIRED:

(i) A linear demand function for oranges **(3 Marks)**

(ii) The unit price of oranges when demand is 1,600 units **(2 Marks)**

(Total 20 Marks)

QUESTION TWO

a) Differentiate between the following terminologies as used in Analytical Statistics

(i) Correlation Analysis and Regression Analysis **(4 Marks)**

(ii) Scatter Diagram and Trend Line of a Time Series **(4 Marks)**

b) The following table shows the Marks scored by 8 students in an Accountancy and Economics tests

Score in Accountancy Test	4	12	6	8	1	1 0	7	12
Score in Economics Test	8	10	8	12	2	11	5	15

REQUIRED:

Calculate Pearson's Product Moment Coefficients of Correlation and Determination and comment on your results. **(12 Marks)**

(Total 20 Marks)

Use: $r = \dfrac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - \left(\sum x\right)^2} \times \sqrt{n\sum y^2 - \left(\sum y\right)^2}}$

QUESTION THREE

(a) Write concise explanatory notes on the following terms as used in business mathematics

(i) Simple and compound interest **(4 Marks)**

(ii) Future and present value of money **(4 Marks)**

(iii) The internal rate of return of investment **(2 Marks)**

(b) The table below represents the projected cash flow of an investment project during its useful life of 5 years:

Years	0	1	2	3	4	5
Cashflow	(40)	120	100	45	30	20

REQUIRED:

Using a discount rate of 15%p.a, calculate

(i) The net present value of the project **(7 Marks)**

(ii) The break even point **(3 Marks)**

(Total 20 Marks)

QUESTION FOUR

(a) In relation to set theory define the following terms:

(i) Universal set **(2 Marks)**

(ii) Complement of a set **(2 Marks)**

(iii) Union of sets **(2 Marks)**

(iv) Intersection of sets **(2 Marks)**

(v) Finite set **(2 Marks)**

Manufacturing Companies have a choice of producing one of three types of products namely, Milk, Coffee or Drinking Water. They must produce one type of product but if they have no preference, they can produce all the three.

A sample poll of 200 Companies revealed the following information: 15 would produce Milk and Drinking Water but not Coffee, 65 would produce Coffee only, 51 would produce drinking water only, 15 would produce both Milk and Coffee, 117 would produce either Milk or Coffee, or both Milk and Coffee, but not drinking water, 128 would produce either Coffee or drinking water, or both Coffee and Drinking water, but not Milk.

REQUIRED:

How many would produce:

(i) All the three products? **(2 Marks)**

(ii) Only one product? **(2 Marks)**

(iii) Milk irrespective of Coffee or drinking water? **(2 Marks)**

(iv) Milk only? **(2 Marks)**

(v) Milk and Coffee but not drinking water? **(2 Marks)**

(Total 20 Marks)

QUESTION FIVE

(a) In relation to index numbers explain the following terms:

(i) Relative index **(2 Marks)**

(ii) Base period **(2 Marks)**

(iii) Consumer price index **(2 Marks)**

(iv) Index of industrial production **(2 Marks)**

(b) The following information shows the expenditures of an average income family during the years 2013 and 2014

	Years			
	2013		2014	
Commodity	Price	Quantity	Price	Quantity
Milk (litres)	36	100	40	95
Maize flour (kg.)	80	12	90	10
Sugar (kg.)	45	16	41	18
Eggs (units)	5	1,100	6	1,200

Required:

Compute the following price indices:

(i) Laspeyre's Index **(5 Marks)**

(ii) Pasche's Index **(5 Marks)**

(iii) Fishers Ideal Index **(2 Marks)**

(Total 20 Marks)

QUESTION SIX

The following are supermarket sales for siven periods (Frw):

	Week 1	Week 2	Week3	Week 4
	Millions	**Millions**	**Millions**	**Millions**
Monday	22	22	24	26
Tuesday	36	34	38	38
Wednesday	40	42	43	45
Thursday	48	49	49	50
Friday	61	58	62	64
Saturday	58	59	58	58

REQUIRED:

a) The 6 point moving average **(12 Marks)**

b) The deseasonalised data assuming additive model **(8 Marks)**

(Total 20 Marks)

QUESTION SEVEN

The following table shows the heights of a group of 200 students.

Height in cm	Frequency
140-150	2
150-160	28
160-170	63
170-180	74
180-190	20
190-200	11
200-210	2

REQUIRED:

(a) The Median Height **(5 Marks)**

(b) The Modal Height **(5 Marks)**

(c) The Mean Height **(5Marks)**

(d) The Variance and Standard Deviation of the height of the students **(5 Marks)**

(Total 20 Marks)

End of question paper