INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS OF RWANDA
Driving Sustainable Performance

Associate of IFAC

CERTIFIED ACCOUNTING TECHNICIAN

LEVEL 1 EXAMINATION

L1.4: BUSINESS MATHEMATICS

THURSDAY: 13 JUNE 2013

INSTRUCTIONS:

1. **Time Allowed: 3 hours 15 minutes** (15 minutes reading and 3 hours writing).
2. This examination has **six** 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, where applicable.

Attempt any five questions

QUESTION ONE

The following table shows the distribution of the salaries of residents of Kayonza Town, obtained from a recently conducted research:

Salary (Frw)	Number of residents
Less than 5,000	390
5,000 – under 15,000	910
15,000 – under 30,000	1,220
30,000 – under 45,000	990
45,000 – under 65,000	1,300
65,000 – under 75,000	500
75,000 and above	280

Required:

a) Compute the mean salary of the residents. **(4 marks)**

b) Find the standard deviation of the salary. **(5 marks)**

c) Calculate the coefficient of variation. **(3 marks)**

d) Draw ogive curve for the above data. **(8 marks)**

(Total 20 marks)

QUESTION TWO

(a) James invested Frw 2,000,000 in Faida Bank at an interest rate of **r%** per annum, compounded semi-annually. The investment earned him total interest of Frw. 200,000 after a period of 3 years.

Required:

(i) Percentage rate of interest. **(3 marks)**

(ii) Total interest that James would have earned after the 3-year period, if he had invested the amount in an investment fund that offered him interest at a rate of 18% per annum, compounded semi-annually. **(3 marks)**

(b) Mary has acquired processing machinery at a cost of Frw.100, 000. It has a useful life of 5 years and a scrap value of Frw.40, 000.

Required:

(i) Annual rate of depreciation using the reducing balance method. (**4 marks)**

(ii) Net book value after the third year, using the reducing balance method. **(2 marks)**

(iii) Net book value after the third year, using the straight line method. **(3 marks)**

(iv) Difference between the net book value after the fourth year, using the reducing balance method and the straight line method. **(3 marks)**

(Total 20 marks)

QUESTION THREE

a) Define the term **"mutually exclusive events"** **(2 marks)**

b) If P(A) = 0.4; P(B) = β and P(AUB) = 0.8;

Find β given that:

(i) **A** and **B** are mutually exclusive events. **(3 marks)**

(ii) **A** and **B** are independent events. **(5 marks)**

c) A set of grades on a professional examination are approximately normally distributed with mean, μ = 74 marks and standard deviation, σ = 7.9.

Required:

(i) Lowest passing grade if the lowest 10% of the students fail the examination. **(5 marks)**

(ii) Highest passing grade if the top 5% of the students excel in the examination. **(5 marks)**

(Total 20 marks)

QUESTION FOUR

A firm ascertained that if it increased its selling price from Frw 30 to Frw 31, demand falls from 15,000 units to 14,500 units. The firms total cost function is given by C = 12q + 88,000.

Required.

a) Construct the demand function **(5marks)**
b) Determine the quantity for maximum profit **(5marks)**
c) Determine the price at the maximum quantity **(5marks)**
d) Find the maximum profit **(5 marks**

(Total 20 marks)

QUESTION FIVE

a) Explain **three** methods that can be used for fitting a trend in a time series data. **(6 marks)**

b) Explain the procedure you would follow in performing the following tasks on a MS Excel worksheet

i) Change column width to fit the contents? **(3 marks)**

ii) Combine several cells into one? **(3 marks)**

c) When Mr. Okubasu died he left a will in which the wife was entitled to 50% of the inheritance. The balance was to be shared between two sons and one daughter. The first son would get half of the balance while the second son and the daughter would share the remaining balance (after the first son's share) in the ratio 2:1 respectively. If the daughter got Frw' 300,000. Determine the total amount of the inheritance **(4 marks)**

d) Msakulu and Martha are business partners. Martha is entitled to a salary of Frw 20,000 per month because she works fulltime. The net profit at the end of the year is then shared as follows:

Msakulu	1/3
Martha	2/3

At the end of the year Martha's earning totaled Frw. 540,000.

Required:

Compute Msakulu's profit share. **(4 marks)**

(Total 20 marks)

QUESTION SIX

a) A sum of Rwandan francs 100,000 is invested at 12% interest per annum. How long will it take for the investment to amount to Frw. 300,000? **(3 marks)**

b) A company intends to purchase a machine at the beginning of January 2012 for Frw 12 million. During the five years of operation of the machine it is estimated to generate the following net cash inflows at the end of each year.

Year	2012	2013	2014	2015	2016
Net cash inflow in Frw"000"	6,600	6,000	4,500	(1,000)	(2,600)

Required:

i) Calculate the net present value of the machine using a discount rate of 15% and advise the company on whether to acquire the machine. **(4 marks)**

ii) If the purchase of the machine is to be financed with a 5 year loan, that requires equal annual installments at an interest rate of 15% per annum, prepare an amortization schedule over the 5 year period. **(5 marks)**

(c) If the Frw. 12 million debt, which is compounded annually at 15% is to be discharged by a sinking fund method, under which equal annual deposits will be made into a fund paying 10% interest compounded annually, produce the schedule for the sinking fund. **(8 marks)**

(Total 20 marks)

End of question paper