NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

CTO – Financial Mathematics

T070

Thursday, 29/7/2021

08:30 – 11:30 AM

Names: .....

Index number: .....

TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

QUESTIONS and ANSWERS BOOKLET

OPTION/TRADE: **CUSTOMS AND TAX OPERATIONS**

SUBJECT: **Financial Mathematics**

ACADEMIC YEAR: **2020-2021**

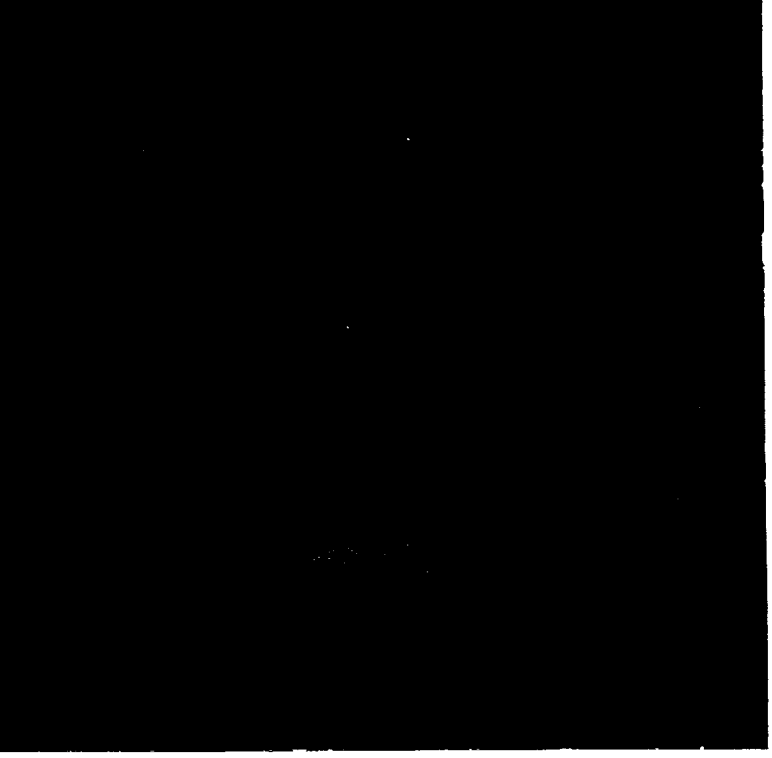
Read carefully the instructions on page (i) & (ii).

FOR EXAMINER'S USE ONLY

QUESTIONS	1	2	3	4	5	6	7	8	9	10	Total
Marks											

QUESTIONS	11	12	13	14	15	16	17	18	19	20	Total
Marks											

QUESTIONS	21	22	23	24	25	26	27	28	29	30	Total
Marks											



TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

INSTRUCTIONS TO CANDIDATES: PART I (Answer Booklet)

1. A candidate should fill in the actual names and the index number on the cover of this questions and answer booklet on the provided place (Black Box).

2. It is illegal for a candidate to write any of his/her names, index number or a school name inside the answer booklet.

3. A candidate should check if all pages of the answer booklet are complete. No candidate should remove or tear any pages or part of it from the answer booklet.

4. A candidate should answer in the language in which the examination is set. (See page ***(ii)***)

5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.

6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.

7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.

8. Write your answers on the 12 lined pages (From page 1 of 12 to page 12 of 12).

9. Use the last non-lined pages as draft.

10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

OPTION/TRADE: CUSTOMS AND TAX OPERATIONS

SUBJECT: Financial Mathematics

DURATION: 3 hours

INSTRUCTIONS TO CANDIDATES: PART II (Question Paper)

The paper is composed of two (2) main Sections as follows:

Section I: Attempt all the Twelve (12) questions (60 marks)
Section II: Attempt any Four (4) questions out of Six (6) (40 marks)

Allowed materials:

-Ruler and square
-Calculator

Note:

Every candidate is required to carefully comply with the provided assessment instructions.

Section I: Attempt all the Twelve (12) questions **(60 marks)**

01. Differentiate the simple interest from compound interest. **(5 marks)**

02. Find the simple interest on 560,000Frw at 12% p.a (per annum) from July 15 to September 26, 2018. **(5 marks)**

03. How many years will the sum be double of itself at 10% per year simple interest? **(5 marks)**

04. At what rate percent will a sum, become double of itself in 5years at simple interest? **(5 marks)**

05. In a certain time 12,000Frw becomes 15,600Frw at 10% p.a simple interest. Find the principal that will become 22,320Frw at 8% p.a in the same time. **(5 marks)**

06. The difference between simple interest and compound interest on a sum put out for 5 years at 2% was 4,800Frw. Find the Sum and then calculate those interests. **(5 marks)**

07. **a)** What do you mean by Annuity? **(2 marks)**

b) Differentiate the Amount of an annuity from Present value of an annuity. **(3 marks)**

08. A Professor retires at the age 60years. He will get the pension of 4,200,000Frw a year paid in half-yearly installment of rest of his life. Reckoning his expectation of life to be 15 years and that interest is at 10% p.a payable half-yearly. What single sum is equivalent to his pension? **(5 marks)**

09. A person borrowed 80,000 Frw at a certain rate of interest for 2 years and then 100,000 Frw at 1% lower than the first. In all he paid 25,000 Frw as interest in 3 years. Find the two rates at which he borrowed the amount. **(5 marks)**

10. There is a committee to be selected comprising of 5 people from a group of 5 men and 6 women. If the selection is randomly done. Find the possibility of having at least one (1) man and at least one (1) woman to be in the committee. **(5 marks)**

11. On April1, 2016; Company Y purchased a machine for 1,000,000 Frw. This is to have 5 useful life years. The salvage value is 140,000.

Company considers depreciation for the nearest whole month. Using double declining balance method for depreciation, complete the table below:

Year	Book Value At The Beginning	Depreciation Rate	Depreciation Expense
2016			
2017			
2018			
2019			
2020			

(5 marks)

12. The simple interest for 3 years on an amount was 30,000Frw and compound interest on the same rate of interest for 2 years was 21,000Frw.

Find the Principal and the rate in interest. **(5 marks)**

Section II: Attempt any Four (4) questions out of Six (6) (40 marks)

13. Mr Kingston wishes to invest accumulated savings of Frw 2,000,000 in one of the three possible Investments Plans for a period of two years and has consulted you for advice. All the three Plans pay compound interest accrued at the end of previous years as follows: **Plan (A)** pays 13% interest rate compounded annually. **Plan (B)** pays 12.5% interest rate compounded twice a year while **Plan (C)** pays 12% interest rate compounded six times in a year.

Required:

a) Calculate the value of each Plan after the 2 years Period. **(7 marks)**

b) Which is the best Plan for above man? Why? **(3 marks)**

14. A man purchased a house valued at 300,000,000Frw. He paid 200,000,000Frw at the time of purchase and agreed to pay the balance with interest of 12% p.a. compounded half yearly in 20 equal half yearly installments. If the 1st installment is paid after six months from the date of purchase, find the amount of each installment. (Given log 10.6= 1.0253 and log 31.19=1.494). **(10 marks)**

15. **a)** What is the present value of 1,000,000 Frw due in 2 years at 5% compounded interest, if interest is paid (i) yearly, (ii) half-yearly? **(5 marks)**

b) A sum of money invested at compound interest yearly amounts to 108, 000 Frw at the end of the second year and to 112,320 Frw at the end of the third year. Find the rate of the interest and the Sum. **(5 marks)**

16. Monthly earnings of ten employees are:

10,000	12,000	13,000	11,000	10,900	10,100	15,000	19,000	17,000	12,000

Find the:

a) range **(2 marks)**

b) mean **(3 marks)**

c) Variance and standard deviation. **(5 marks)**

17. A machine comprises of 3 transformers A,B and C. The machine may operate if at least 2 transformers are working. The probability of each transformer working are given as shown below:

P(A)=0.6 ; P(B)=0.5 ; P(C)=0.7

A mathematical engineer went to inspect the working conditions of those transformers. Find the probabilities of having the following outcomes:

a) Only one transformer operating **(2 marks)**

b) Two transformers are operating **(2 marks)**

c) All three transformers are operating **(1.5 marks)**

d) None is operating **(1.5 marks)**

e) At least 2 are operating **(1.5 marks)**

f) At most 2 are operating **(1.5marks)**

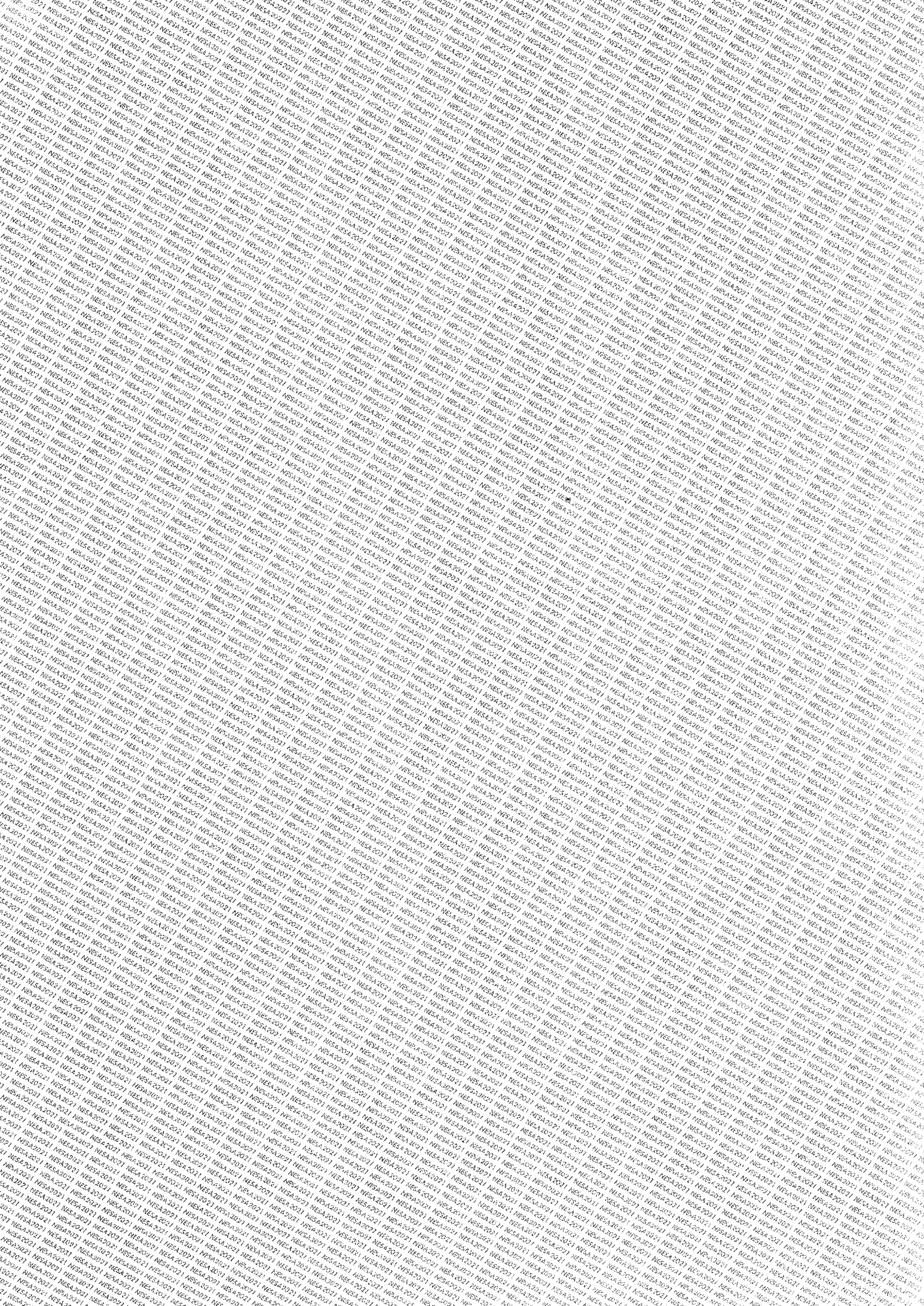
18. **a)** Company A sells a color television for 450,000 Frw cash. If the TV is purchased on an installment plan, a down payment of 45,000 Frw and 15 monthly payments of 30,260 Frw each are required. What is the added cost, if any, of buying the television on time? **(4 marks)**

b) A lawn mower was purchased on April 1 for 240,000 Frw less a down payment of 60,000 Frw. The balance of 180,000Frw is to be paid off in equal monthly installments over a period of 3 months with interest on the unpaid balance at 9% annual.

Complete the table below of the installments and balance due each month:

Payment date	**Unpaid balance**	**Interest for month**	**Amount due**	**Installment Payment**	**Balance due**
May1					
Jun1					
July1					

(6 marks)


MESA 2021