



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Fax: 254-20-891084
E-mail: academics@cuea.edu

MAIN EXAMINATION

SEPTEMBER – DECEMBER 2019 TRIMESTER

SCHOOL OF BUSINESS

DEPARTMENT OF ACCOUNTING AND FINANCE

REGULAR PROGRAMME

CFD 081: ACTUARIAL AND FINANCIAL MATHEMATICS

Date: DECEMBER 2019

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

- Q1. a) Define each of the following as applied in Financial Mathematics
- Perpetuity
 - Exact interest
 - Amortization schedule
 - Annual effective rate
 - Accumulation

(5marks)

- b) Find the future value of
- Sh. 5,800,000 worth $J_{12} = 12\%$ due in 25 years
 - Sh. 250,000 worth $J_2 = 9.6\%$ due in 10 years
 - Sh. 80,000 worth 12.5% Compounded daily, due in 3 years
 - Sh. 30,000 with simple interest of $16\frac{1}{2}\%$ per annum due in 5 years
 - Sh. 50,000 due in 15 months if money is worth 11% compounded continuously

(10marks)

- c) Find the half-year rate equivalent to
- i. 16% compounded quarterly
 - ii. 18% compounded monthly
 - iii. $9\frac{1}{4}\%$ compounded daily
 - iv. 12% compounded continuously
 - v. 9% Compounded weekly

(10Marks)

- d) Derive the fundamental interest formula

(5marks)

Q2. Find the accumulated amount for sh. 350,000 per year for 7 years if money is worth;

- a. $J_1 = 8.9\%$ and payment is made at the end of every year
- b. $J_1 = 10\frac{3}{4}\%$ and payment is made at the beginning of each year
- c. $J_1 = 17.29\%$ and payment made at the end of each year but after a 2-year grace period
- d. $J_1 = 12.5\%$ and payment is made at the beginning of each year after a 3-year grace period

(20marks)

- Q3. a) Using the banker's rule find the
- i. Simple interest on sh.80, 000 from March 21, 2004 to July 24, 2004 at $14\frac{1}{2}\%$ per annum.

(5marks)

- ii. Compound interest on sh. 250,000 from August 15, 1995 to May 1, 1996 at 23.06%

(5marks)

- b) Sh. 500, 000 was deposited in an account with an interest of $j_2 = 12.5\%$. Find
- i) The time it takes for the amount to double

(5marks)

- ii) The total amount in the account at the end of 5years if sh. 250,000 was withdrawn at the end of 3 years.

(5marks)

Q4. Find the discounted value of the following simple ordinary annuities

- a) Sh. 200,000 at the beginning of each year for 8 years at $J_1 = 9.6\%$
- b) Sh. 50,000 a month for 4 years 3 months at $J_{12} = 10\%$
- c) Sh. 80,000 Per quarter for 6 years 3 months at $J_4 = 14\frac{1}{4}\%$,
- d) Sh. 100,000 per half-year for 10 years at $J_2 = 12.23\%$ **(20marks)**

END