WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF MANAGEMENT AND ENTREPRENEURIAL SCIENCES

DIPLOMA IN BUSINESS MANAGEMENT

MAIN PAPER

DM223: **FINANCIAL MATHEMATICS FOR BUSINESS**

INTAKE 3: **SECOND YEAR SECOND SEMESTER**

TIME: **2 HOURS**

INSTRUCTIONS TO CANDIDATES

Answer Question **1** and any other **two**.

ADDITIONAL MATERIAL

Graph paper

Question 1

a) Find the discount price if a discount of 12.5% is given on a cost price of $560. [5]
b) The hire purchase price of a kitchen unit is $840. A deposit of 25% is paid. The rest is paid over 12 equal monthly payments. Find the amount of each monthly instalment. [5]
c) Find the loss and selling price for a cost price of $750 and loss 8%. [5]
d) Given that 1 USD = 81.71 Zimbabwe Dollar, exchange 20 000 Zimbabwe dollars to US dollars. [5]
e) $2 000 is invested at 10% per annum compounded half-yearly. After three months, the interest rate changes to 12% per annum compounded monthly. Find the value of the investment after two years. [6]
f) A lady pays a quarterly premium of USD750 on an endowment policy a life insurance company. The term of the policy is 15 years. How much would she receive on maturity, assuming an interest rate of 14.5% p.a. compounded quarterly? [7]
g) A student loan of RTGS26 000 is to be repaid by 12 equal quarterly instalments at an interest rate of 14% p.a. compounded quarterly. What is the amount of each instalment if each instalment is only paid at the end of each quarter? [7]

Question 2

The following table gives the liabilities of building societies, USD Million, for a certain country.

End of:	Deposits	Capital and Reserve	Other liabilities	Total liabilities
January 2017	143	106	35	284
February 2017	155	108	36	299
March 2017	86	92	13	191
April 2017	78	95	10	183
May 2017	97	91	14	202
June 2017	113	92	16	221

a) Obtain row percentage distribution. [15]
b) Interpret the results. [5]

Question 3

A company wishes to establish a sinking fund for the purpose of acquiring new processing equipment. The company needs to accumulate $160 000 over the next three years.

a) How much should the company contribute to the fund at the end of every 6 months in order to raise the amount? Interest rate is 12% p.a compounded semi-annually. [5]

b) Prepare the sinking fund schedule. [15]

Question 4

A loan of $1 000 is to be repaid at the end of 4 years. The repayment deposits are made at the end of each year. Interest rate is 8% p.a compounded annually. Draw up an amortisation schedule. [20]

Question 5

Given the constraints $x-y\leq -2$, $3x-4y\geq -12$, $x\geq 0$ and $y\geq 0$, find the values of x and y for which $z=2x+3y$ is a minimum. [20]

Question 6

An investment company has developed the following data regarding the rates of return available on a potential project and the market.

State of economy	Probability of each state occurring	Rate of return when investment is in market	Rate of return when investment is in project
Deep recession	0.05	-20%	-30%
Mild recession	0.25	10	5
Average	0.35	15	20
Mild boom	0.20	20	25
Strong boom	0.15	25	30

Determine each option's;

a) Expected rate of return; [6]
b) Variance; [9]
c) Standard deviation; and [2]
d) Coefficient of variation. [3]
[Present your answers in a tabular form for easy comparison]

END

FINANCIAL MATHEMATICS FORMULAE

Simple Interest	$Fv = Pv(1+in)$
Compound Interest (Future Value)	$Fv = Pv(1+i)^n$
Compound Interest (Present Value)	$Pv = \frac{Fv}{(1+i)^n}$
Annuity (Future Value)	$Fv = R\frac{[(1+i)^n-1]}{i}$
Annuity (Present Value)	$Pv = R\frac{[1-(1+i)^{-n}]}{i}$
Expectation	$E(x) = \sum x_i p_i$
Variance	$Var(x) = E(x^2)-E(x)^2$
Standard Deviation	$SD = \sqrt{Var(x)}$
Coefficient of variation	$CV = \frac{SD}{E(X)}$ x 100%