JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS & ECONOMICS

UNIVERSITY EXAMINATION FOR THE DIPLOMA IN BUSINESS ADMINISTRATION

1ST YEAR 1ST SEMESTER 2016/2017 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: BBM 2112

COURSE TITLE: BUSINESS MATHEMATICS

EXAM VENUE:

DATE:

DURATION: 1HOUR 30 MINUTES

INSTRUCTIONS

1. **Answer QUESTION ONE and any other TWO questions**
2. **Show all your workings.**
3. **Do not write anything on the question paper**

QUESTION ONE (30 MARKS)- COMPULSORY

a. An Economist believes that the size of a regional economy (as measured by GDP) can be accurately measured as follows.

YEAR	1	2	3	4	5
GDP (shs. billions)	250	267.5	285	302.5	320

Required: calculate the size of the regional economy in year 27. (4 mks)

b. State the disadvantages of simulation. (2mks)

c. Find the derivative of the following function.

$(X^2+4)(6x^{1/2}+3)$. (3 mks)

d. Integrate the following function with respect to x.

$8x^3-3x^2+8x-10$. (2 mks).

e. You have been offered a new contract. The starting salary is £12,000 per annum and there is an incremental increase of £800 at the end of each year. What will your salary be at the end of year six and what will your total earnings be over this period?(6 mks).

f. Two projects are being considered and it is required to calculate the expected value of each project. The project data have been estimated as follows.

States of nature	Project A's cashflow 'shs'	Probability	Project B's cashflow 'shs'	probability
Optimistic prediction	900,000	0.2	600,000	0.2
Moderate prediction	600,000	0.6	600,000	0.6
Pessimistic prediction	300,000	0.2	600,000	0.2

Calculate expected value of each project (6 mks).

g. What is the present value of an annuity of £700 p.a received for 10 years when the discount rate is 15% . (2 mks).

h. A company invests shs. 500,000 in a money market fund which is expected to yield interest at a rate of 10% per year compounded quarterly. If the interest rate projections are valid, to what amount should the shs. 500,000 grow over the next 10 years? How much interest will be earned during this period? (3 mks).

i. You have been offered a new contract. The starting salary is £12,000 per annum and there is an incremental increase of £800 at the end of each year. What will your salary be at the end of year six ? (2 mks)

Question two.

a) A financial analyst is analyzing the prospects of a certain company. The company pays an annual dividend on its stock. A dividend of shs. 5 has just been paid and the analyst estimates that the dividends will grow by 20% per year for the next five years, followed by annual growth of 10% per year for 5 years. Calculate the total dividend that will be paid for the next ten years. (10 mks).

b) State the features of an ideal investment appraisal method. (3 mks).

c) A certain investment project has possible outcomes and probabilities as shown below.

States of nature	Outcome '000'	Probability
Pessimistic	400	0.3
Moderately successful	600	0.5
Optimistic	800	0.2

i) Compute the standard deviation of the outcomes from the project. (5 mks).

ii) Calculate the coefficient of variation. (2 mks)

Question three.

A firm is considering two separate capital projects. Project A requires an initial outlay of shs. 80,000 and project B requires initial cash outlay of shs. 120,000. The expected net returns from the projects is as follows;

Year	1	2	3	4	5
Project A (SHS)	20,000	23,000	25,000	33,000	45,000
Project B (SHS)	30,000	50,000	70,000	50,000	15,000

a) Using NPV criterion and a discount rate of 15%, choose the project that is more profitable. (8 mks).

b) Estimate the IRR for each project. (12 MKS)

Question four.

a) A refrigerator manufacturer can sell all the refrigerators of a particular type that he can produce. The total cost (£) of producing *q* refrigerators per week is given by 300q+2,000.The demand function is estimated as 500-2q.

i) Derive the revenue function , R. (4 mks).

ii) Obtain the total profit function. (4 mks).

iii) How many units per week should be produced to maximize profit? (6 MKS)

iv) What is the maximum profit available? (4 mks).

v) Explain the utilities of calculus in business. (2 mks)

Question Five.

a) Briefly explain the decision making situations. (6 mks).

b) Explain the meaning of the following terms as used in decision theory.

i) Decision tree diagram. (1 mk).

ii) Decision payoff. (1 mk).

c) A businessman wants to decide whether to stock commodity X or commodity Y. He can stock either but not both. If he stocks X and if it is a success, he feels that he can make £200 but if it is a failure he will lose £500. If he stocks Y and if it is a success, he feels that he can make £400 but if it is a failure he would lose £300.
He has the following probability distribution in view.

Probability of;	With stock of commodity X.	With stock of commodity Y.
Success	0.80	0.60
Failure	0.20	0.40

i) Represent the above information on a decision tree diagram. (6 mks).

ii) Calculate the expected monetary value of each commodity. (4 mks).

iii) Using the expected monetary value calculated in (ii) above, advise the businessman as to which commodity he should stock. (2 mks).

JARAMOGI OGINGA ODINGA
UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS AND ECONOMICS
COURSE OUTLINE.
DIPLOMA IN BUSINESS ADMINISTRATION (DBA).
COURSE UNIT: BBM 2112 - Business Mathematics.
Duration: JAN – APRIL 2017

Contact: 0716888574 E-mail: jaredoganda@gmail.com.
COURSE INSTRUCTOR: JARED OGANDA.

Course Objective.

This course is intended to equip the students with knowledge, skills and attitudes that will enable him/her to apply mathematical skills in business transactions.

COURSE CONTENT.

Series; arithmetic series, geometric series, progression series, time value of money, investment appraisal and annuities; introduction to risk and return; basic business calculus and its application in business; decision models: use of decision trees, simple simulation models, EMV.

1.Series.

- Sequences and Series.
- Arithmetic Series.
- Geometric series.
- Progression Series.

2.Time value of Money.

- Concept of interest rates.
- Discounting and compounding.
- Present value & future values.
- Capital Investment.
- Discounted cash flow. Net present value (NPV), internal rate of return (IRR).
- Comparison of projects.

- Comparison of appraisal techniques.
- Annuities: - Definition and types of annuity, calculations involving annuities (Accrued amount / compound interest method & sum of the first *n* terms of a GP. Method.
- Net present value of an annuity.
- Risk and Return. Measurement of risk
  Standard deviation of cash flows.

  Coefficient of variation.

CAT 1

3.Business Calculus.

- Definition and basic operations in calculus.
- Utilities of calculus in business.
- Rules/techniques of differentiation.
- First and second order conditions.
- Integration.
- Application of derivatives.

4.Decision models

- Decision making environments.
- Decision situations.
- Objectives of a decision maker
- Alternative plans of action/strategies.
- Decision payoff and decision tree diagram.
- Expected monetary value (EMV) and its interpretation.

5.Simple Simulation.

- Meaning, definition, advantages and disadvantages of simulation.
- Analytical vs simulation models.
- Application of simulation.
- Simple inventory simulation models.

CAT 2

References.

Key texts.

1. Andre Francis: Business mathematics and statistics. 6th ed 2004.
2. Terry. Lucey; Quantitative techniques 6th edition reprinted 2011.

Others.

3. Jon Curwin & Roger Slateri. Quantitative Methods for business decisions: 6th ed, 2008.
4. CR. Kothari : Quantitative techniques 3rd ed. 2009.
5. Prof. Paul Manasseh:A textbook of business finance, Mc More Accounting books , 1990.

Your course grade will be determined as follows:

Cat 1	15%
Cat 2	15%
Final exam	70%
Total	**100%**