JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS AND ECONOMICS

UNIVERSITY EXAMINATION FOR THE CERTIFICATE IN BUSINESS ADMINISTRATION

1ST YEAR 1ST SEMESTER SEPTEMBER DECEMBER 2022

ACADEMICYEAR

MAIN CAMPUS

COURSECODE: BCA 2112

COURSETITLE: INTRODUCTION TO BUSINESS MATHEMATICS

DATE: 05/12/2022 **EXAM SESSION: 9.00-11.00AM**

TIME:2 HOURS

INSTRUCTIONS

1. This paper contains **FIVE** questions.
2. Answer question1 (Compulsory) and **ANY** other **TWO** questions.
3. Candidates are advised not to write on the question paper.
4. Candidates **MUST** hand in their answer booklets to the invigilator while in the examination room.

QUESTIONONE(30MARKS)

a) State the **disadvantages** of simulation.(3marks)

b) Find the derivative of the following function.(3marks)

$(x^2+4)\ (6x^{1/2}+3)$

c) Integrate the following function with respect to x.(2marks)

$8x^3-3x^2+8x-10$

d) Explain the concept of Time Value of Money. (2marks)

e) Sakwa decided to invest sh. 100,000 in a savings account paying 8% interest compounded semi annually.If she leaves the money in the account for two years, howmuchwillshehaveattheendofthetwoyears?

(3marks)

f) Discuss the following terms as used in Finance.

(i) Discounting and compounding (2marks)

(ii) Ordinary annuity and annuity due. (2marks)

g) Sonbricompanylimitedmanufactureslargescaleunits.Ithasbeenshownthatthemarginalvariable costwhichisthe gradient of the total cost curve is sh. (92-2x)thousands. Where x is the number of units of output perannum. The fixed costs are sh. 800,000 per annum. It hasalso been shown that the marginal revenue which is thegradientofthetotalrevenueissh.(112-2x)thousands.

Required:

(i) Establish by integration the equation of Total Cost Curve. (2marks)

(ii) Establish by integration the equation of the total revenue curve. (2marks)

(iii) Establish the break even situation for Sonbri companyLtd. (2marks)

(iv) Determine the number of units of output that would;

a) Maximizetotalrevenue. (2marks)

b) Maximize the total costs, together with the maximum total revenue and total costs. (5marks)

QUESTIONTWO

(a) ExplainFIVEidealfeaturesofinvestmentdecisions.(5marks)

(b) HighlightstepsinCapitalBudgetingProcess.(5marks)

(c) ExplainfiveweaknessesofPayBackPeriodmethod.(5marks)

(d) JeremyLtdwishestoexpanditsoutputbypurchasinga new machine worth sh. 170,000 and installation costsareestimatedatsh.40,000.Itsexpectedinflowsare:

Year1.	Sh.60,000
Year2.	Sh.72,650
Year3.	Sh.35,720
Year4.	Sh.48,510

Year5. Sh.91,630

Year6. Sh.83,715

Thiscompanycanraisefinancetopurchasethemachineat 12%interestrate.

ComputeNPVandadviseManagementAccordingly.(5marks)

QUESTIONTHREE

(a) Definethefollowingtermsasusedinsimulation.

(i) Asystem. (2marks)

(ii) Stateofasystem. (2marks)

(iii) DiscreteSystem. (2marks)

(iv) AcontinuousSystem. (2marks)

(v) DynamicSimulation. (2marks)

(b) ABC Ltd recently acquired a threshing machine with auseful life of 15 years. Over the useful life, the machine islikelytohaveperiodicfailuresandbreakdowns.Partofthedata for similar machines indicates a probabilitydistributionof failuresas follows.

No.OfFailures	0	1	2	3
Probability	0.80	0.15	0.04	0.07

Required:

(i) Usingtherandomnumbersprovidedbelow,simulatethenumberoffailuresthatwilloccur overtheusefullifeofthemachine.

Randomnumbers:70,88,37,12,45,99,54,71,64,93,67,80,55,34,22.
(8marks)

(ii) Determinetheaverageannualfailurerate. (2marks)

QUESTION FOUR

(a) Discuss fourty pes of Decision Making Environments.(8marks)

(b) A manager has a choice between:

(i) A risky contract promising sh7 million with a probability of 0.6and4Million with a probability of 0.4and

(ii) Adiversified portfolio consisting of two contracts with independent outcome, each promising sh. 3.5 million withprobability0.6andsh.2millionwithaprobability0.4.

ArriveattheDecisionusingEMVMethod. (6marks)

(c) Explain three benefits and three risks involved by delaying a decision as long as reasonably possible. (6marks)

QUESTION FIVE

(I) The 2^{nd} and 7^{th} terms of an A Pare-5and 10 respectively .Find:

(a) The common difference (4marks)

(b) The First Term. (2marks)

(c) The sum of the first 16 terms. (4marks)

(II) Yvonne begins her new job in January with a monthly salary of sh. 1500.Her salary is to be increased by sh. 50 every month beginning February.

(a) How much will she earn in the last month of;

(i) The first year. (3marks)

(ii) The third year. (3marks)

(b) How much will she earn for the first two years. (4marks)