MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF ARTS IN ECONOMICS AND BACHELOR OF BUSINESS ADEMINISTRATION WITH INFORMATION TECHNOLOGY

MAIN CAMPUS

AEC 304: QUANTITATIVE METHODS I

Date: 14th January, 2016

Time: 2.30 - 4.30pm

- Answer Question ONE and any other TWO Questions.
- Question ONE carries 30 marks and the rest 20 marks each

Question One (Compulsory)

a) Discuss the various roles of quantitative techniques in business and Industry (10 marks)

b) A company receives shipment of certain items. It should decide whether to accept or reject the shipment, on the basis of inspection of a sample selected from the shipment. From the past experience, it is known that the percentage of defective items in a batch of shipment is 0, 2 or 5, the probabilities for which are 0.5, 0.3 and 0.2 respectively. The company can accept only those batches which have no defectives. The cost of rejecting a good batch i.e. a batch with no defectives is $ 200.The cost of accepting a batch with 2 percent defective is $ 400 and the cost of accepting the batch with 5% defective is $ 600.

A sample of 10 items has been selected from the shipment and two items are found to be defective. The conditional probabilities of getting 2 defectives in a sample of 10 items from the batch of 0%,2% and 5% defectives are calculated as 0.083, 0.185 and 0.265 respectively.
Required: Determine whether the shipment should be accepted (10 marks)

c) Discuss the steps involved in decision making in general. (6 marks)

d) Using examples explain the criterions used in selecting an alternative in decision making. (4 marks)

Question Two

a) Discuss the importance of Input output analysis in economic analysis (4 marks)

b) An economy has three industries; Coal,Electricity and Railways.To produce Ksh 1 of coal requires Ksh 0.25 worth of electricity and Ksh 0.25 rail cost of transportation. To produce Ksh 1 of electricity it requires Ksh 0.65 worth of coal for fuel,Ksh 0.05 of electricity for auxiliary equipment and Ksh 0.05 for transportation; to provide Ksh 1 worth of transport ,the railway requires ksh 0.55 coal for fuel and ksh 0.10 of electricity. Each week the external demand for coal is Ksh 50,000 and for electricity is Ksh 25,000.There is no external demand for railway. What should be the weekly production schedule be for each industry (14 marks)

c) What is a Leontief inverse (2 marks)

Question Three

a) Discuss any five characteristics of the primal and the dual problem in linear programming. (5 marks)

b) A furniture manufacturing company plans to make two products- chairs and tables from available resources, which consists of 400 board feet of mahogany timber and 450 man hours of labour.It knows that to make a chair requires 5 board feet and 10 man hours and yields a profit of $ 45.While each tables uses 20 board feet and 15 man hours and a profit of $ 80.

    i.   Formulate the above statement as a linear programming problem to determine how many chairs and tables the company can make keeping within its resource constraint so that it maximizes the profit. (4 marks)

    ii.   Solve the problem using simplex method (11 marks)

Question Four

a) Hena Company limited has been faced with the decision alternatives of either Expand, Build or Subcontract its operations. The table below gives the payoff for the company at various states of nature.

		Decision alternatives		
		Expand	Build	Subcontract
	High	500,000	700,000	300,000
State of nature	Moderate	250,000	300,000	150,000
(Demand)	Low	(250,000)	(400,000)	(10,000)
	Failure	(450,000)	(800,000)	(100,000)

i). What would the company do under minimax Regret Criterion? (5 marks)

ii). Suppose you feel fairly optimistic and assign $\alpha = 0.7$ advice the company on what decision alternative to take using the realism criterion (5 marks)

iii). Using the expected value criterion identify the best alternative for the probabilities: High=0.2, moderate=0.4,Low=0.3,Failure=0.1 (4 marks)

b) Explain the following terms as used in decision theory

i) State of nature   ii) Pay off   ii) Conflict   (6 marks)

Question Five

a) Discuss the relevance of Probability theory to management and economic decisions   (4 marks)

b) The table below summarizes the results of attitude regarding nuclear war. The question asked was "How likely do you believe that nuclear war occur during the next 10 years?"

Respondent Age	Response			Total
	Very Likely	Likely	Unlikely	
20-29	850	1700	500	3050
30-39	700	1100	450	2250
40 and above	600	600	1500	2700
Total	2150	3400	2450	8000

If a respondent is selected at random from the sample of 8000, what are the following probabilities?

i).   The respondent is 30 years or older

ii).   The respondents believes nuclear war is "likely"

iii).   The respondent is between the ages of 30-39 and believes that nuclear war is "very likely"

iv).   The respondent is between the ages of 20-29 and believes that nuclear war is "unlikely"

v).   The respondent believes that nuclear war is "unlikely" given that he or she is between the ages 20-29

vi).   The respondent is 40 years of age or older, given that he or she believes nuclear war is "unlikely"   (16 marks)