MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FIRST YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF ARTS IN ECONOMICS

(CITY CAMPUS-WEEKEND)

AEC 803: QUANTITAVE METHODS

Date: 20th July 2014 *Time: 2.00 – 4.00/5.00 pm*

INSTRUCTIONS:

- Answer ANY FOUR questions.
- EACH question carries 15 marks.

QUESTION ONE

a) Discuss clearly the roles played by quantitative approach in decision making (7 marks)

b) The optimal simplex tableau for a maximization linear programming problem with all the ≤ constraint is represented below;

Basic	Decision variables			Slack Variables				Solution
	X_1	X_2	X_3	S_1	S_2	S_3	S_3	
S_1	0	0	-3	1	0	-1	-3	50
S_2	0	0	-1	0	1	-0.5	0	50
X_1	1	0	2	0	0	0.5	0	100
X_2	0	1	0	0	0	0	1	50
Z	0	0	6	0	0	4	5	1050

Required;

i) The Optima solution (1 mark)

ii) The Status of each resource associated with each slack variable (3 marks)

iii) The shadow prices of each of the resource (3 marks)

iv) Suppose that it is desirable to increase the maximum availability of some of the resources which ones do you recommend and why? (3 marks)

QUESTION TWO

a) Discuss the applications of Markov chain analysis in Business (4 marks)

b) Explain the fundamental assumptions of Markov chain analysis (4 marks)

c) On Jan 1, 2009, Klosman Firm held 40% of its total market and two other firms Abeingo and Buda held 40% and 20% respectively. Based on a study conducted by a marketing research firm, the following facts were compiled;

- Klosman retains 90% while gaining 5% of competitor Abeingo's customers and 10% of Buda's customers.
- Abeingo retains 85% of its customers, gains 5% of Klosman's customers and 7% of Buda's customers.
- Buda retains 83% of its customers, gains 5% of Klosman's customers and 10% of Abeingo's customers.

Required:

i). Determine each firm's market share on Jan 1, 2011? (3marks)

ii). Determine each firm's market share at equilibrium? (5 marks)

QUESTION THREE

Sales of 21-Inch Color Television sets and three-Month lagged unemployment are shown in the following table.

Period	1	2	3	4	5	6	7	8	9	10	11
Units Sold (y)	20	41	17	35	25	31	38	50	15	19	14
Unemployment % (3 month lag) (x)	7.2	4.0	7.3	5.5	6.8	6.0	5.4	3.6	8.4	7.0	9.0

a) Calculate the correlation between the unemployment levels and the demand for the 21-inch TVs (3 marks)

b) Derive a predictive equation for the units of TV sets sold and the unemployment level (5 marks)

c) What percentage of the variations in the units sold is explained by the unemployment levels in the equation formulated in (b) above. (3 marks)

d) Explain the assumptions of the technique used in (b) above (4 marks)

QUESTION FOUR

a) HENA Company limited has been faced with the decision alternatives of either to Expand, Build or Subcontract its operations. The table below represents the pay offs for the company at various states of nature.

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

Advise using the decision alternative what the company can do under

i). The Minimax Regret Criterion (4 marks)

ii). Suppose you feel fairly optimistic and assign α a value of 0.7, advice the company on the realism criterion. (4 marks)

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

b) Explain the following terms as used in decision analysis

i) Risk ii) Uncertainty iii) States of nature (3 marks)

QUESTION FIVE

a) State and explain the major limitations of input-output models (4 marks)

b) An economy with 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 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 worthy of transport, the railways 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. (11 marks)

QUESTION SIX

a) Discuss the applications of calculus in business decision making? (4 marks)

b) A Ltd is considering making a bid for B Ltd.The anticipated Marginal Profit of B Ltd as a function of time is; $y = 20 + 12X - X^2$
Where y-Marginal profit in Ksh 000s and X is time in years.The bid by A Ltd is to be based on the total anticipated profits of B Ltd during the second and sixth year after takeover. What is the value of the bid (5 marks)

c) A firm has production function $Q(K,L) = 50K^{2/3}L^{1/3}$ and unit capital (K) and labour (L) costs of 6 and 4 respectively. What is the maximum output achievable in a week if the firm spends no more than 1000 each week?Estimate the effect on output if the units of factors of production are increased or reduced by 1-unit? (6 marks)