



UNIVERSITY EXAMINATIONS

**SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF
BACHELOR OF EDUCATION (ARTS)**

BUST 212: QUANTITATIVE METHODS IN BUSINESS

STREAM: B.ED (ARTS) Y2S1

TIME: 2 HOURS

DAY/DATE: MONDAY 26/7/2010

2.30 P.M. - 4.30 P.M.

INSTRUCTIONS:

- Answer **QUESTION ONE (1)** and any other **TWO** questions.
- Question one (1) carries 30 marks and the rest 20 marks each.

1. (a) Explain the various roles of quantitative techniques in business and Industry. [10 marks]
- (b) State and explain the various limitations of quantitative techniques. [5 marks]
- (c) The table below represents the pay offs appropriate to the various situations of a given company.

		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 that a person can make under

- (i) The Maxmax Criterion
- (ii) The Maxmin Criterion
- (iii) The Minimax Regret Criterion
- (iv) Suppose you feel fairly optimistic and assign α a value of 0.7, advice the company on the realism criterion. [15 marks]

2. (a) Discuss the applications of calculus in business decision making. [5 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 is 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? [6 marks]

(c) (i) 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? [7 marks]

(ii) Estimate the effect on output if the units of factors of production are increased or reduced by 1-unit. [2 marks]

3. (a) Discuss the applications of Markov chain analysis in Business. [4 marks]

(b) State and 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? [5 marks]
- (ii) Determine each firm's market share at equilibrium? [7 marks]

4. (a) The data in table below reports the aggregate consumption (Y, in billions of US Dollars) and disposable income (X, also in billions of US dollars) for a developing economy for the 12 years from 1998 to 2009.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Y ₁	102	106	108	110	122	124	128	130	142	148	150	154
X ₁	114	118	126	130	136	140	148	156	160	164	170	178

- (i) State the general relationship between the consumption Y and disposable income X and estimate the consumption regression equation. [8 marks]
- (ii) Find the R² for the estimated consumption regression in (i) above and interpret its value. [4 marks]

- (b) The matrix below illustrates a game for players A and B with equal ability and intelligent. A's choice is strategy (1) or (2) and B's choice is strategy (3) or (4).

		Competitor B	
		(3)	(4)
Competitor A	(1)	5	7
	(2)	4	6

- (i) Calculate the saddle point [2 marks]
- (ii) What are the various possible strategies for the two competitors? [6 marks]
5. (a) Critically discuss the importance of Input output analysis in business. [4 marks]
- (b) State and explain the major limitations of output-input models. [4 marks]
- (c) The following table gives the Input-output coefficient for three sector economy consisting of Agriculture, Industry and Service.

From	Input-Output Coefficients		
	To		
	Agriculture	Industry	Service
Agriculture	0.3	0.4	0.2
Industry	0.2	0.0	0.5
Service	0.1	0.3	0.1

The projected forecast demand for the three sectors Agriculture, Industry and Service are 100, 40 and 50 million shillings respectively (The coefficients matrix is given in terms of money). Determine the gross output of the three sectors that will meet this demand. [10 marks]

- (d) What is a Leontief Inverse? [2 marks]
-

