

# UGANDA MARTYRS UNIVERSITY

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

UNIVERSITY EXAMINATIONS  
SEMESTER II 2009/10

FIRST YEAR EXAMINATIONS FOR BACHELOR OF BUSINESS  
ADMINISTRATION AND MANAGEMENT

QUANTITATIVE METHODS

DATE: THURSDAY 23<sup>RD</sup> JUNE 2010.

TIME: 6:00 - 9:00 PM

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## Instructions

Attempt all questions from section A and any four from section B.

All necessary working must be shown

DO NOT WRITE ON THIS QUESTION PAPER

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### Section A (40 marks)

Q1. Differentiate the following functions

a)  $f(x) = 3x^2 + 2x + 11$

b)  $f(x) = (2x+1)/(3x+9)$ .

Q2. Calculate the determinant of the matrix A where,

$$A = \begin{pmatrix} 3 & 1 & 0 \\ 4 & 5 & 1 \\ 3 & 6 & 4 \end{pmatrix}$$

Q3. The marginal profit function of a company is given by  $200 + x$ . Find the increase in profits in pounds when sales increase from 20 to 40 units.

Q4. a) Given that A and B are independent events, show that A complement and B are also independent.

b) C and D are events such that  $P(C) = 0.5$ ,  $P(D) = 0.4$  and  $P(C \cup D) = 0.7$ .

c) Find i)  $P(C \cap D)$  ii)  $P(C/D)$ .

Q5. Calculate the variance of the following data.

Marks	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Number of students	2	5	5	2	1

Q6. Two functions are given as  $f(x) = 2x - 3$  and  $g(x) = x + 4$ .

Find the values of i)  $f(2)$  ii)  $g(0)$  iii)  $fg(0)$  iv)  $gf(1)$ .

### Section B (60 marks)

Q7. Discuss the stages of quantitative technique as a scientific approach to management. State the possible problem area of each stage and suggest practical solutions to such problems.

Q8. Use Cramer's rule to solve the following equations

$$x - 2y + 3z = 6$$

$$3x + 4y - z = 3$$

$$4x + 6y - 5z = 0$$



Q9. The cost function  $C(x)$  and the revenue function  $R(x)$  of a company are given as  $C(x) = 36 + 4x$  and  $R(x) = x(25 - 3x)$  where  $x$  is in hundreds and the cost/revenue in thousands of shillings.

- Derive the profit function.
- Find the break - even point(s).
- Calculate the level of demand that will maximize profits.
- Find the maximum profit.
- Calculate the revenue(s) at break - even point(s).

Q10. Jenga Mwili Ltd is a hotel which records its revenues in hundreds of dollars quarterly. Their archives for some three years showed the following record.

Year	Quarter1	Quarter2	Quarter3	Quarter4
1	73	90	121	98
2	69	92	145	107
3	86	111	157	122

- Obtain a 3-term moving average, (MA)
- Plot the historigram for both the raw data and that of the MA.

Q11. Zazu Ltd is a computer firm which manufactures and sells computer parts. To produce one unit of a monitor, Zazu requires 4 hours of skilled labour and 2 hours of machine time whereas to produce one unit of keyboard requires 3 hours of skilled labour and 1 hour of machine time. Zazu Ltd can only afford 240 hours of skilled labour and up to 100 hours of machine time. The profits from the sale of a unit of these parts are £7 for a monitor and £5 for a keyboard. The firm wishes to maximize profits. Use the graphical method to find optimal units to be sold and the maximum profits.

Q12. An investor is considering investment in Hotel construction in Masaka. The initial cost of the investment is shs. 24 millions with associated cash inflows over the following four years being shs 9 millions, shs 13 millions, shs 18 millions and shs 18.5 millions respectively. If the cash outflows of the investment over the four years are estimated as shs 10 millions, shs 8 millions, shs 4 millions and shs 3 millions.

- Evaluate the NPV of the investment at discount rates of 20% and 10%.
- At which discount rate is the investment worthwhile?
- Calculate the IRR of the investment.

END.