



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS & ECONOMICS
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF LOGISTICS
AND SUPPLY CHAIN MANAGEMENT
2ND YEAR 1ST SEMESTER 2015/2016 ACADEMIC YEAR
MAIN CAMPUS- RESIT

COURSE CODE: BBM 3214

COURSE TITLE: BUSINESS MATHEMATICS

EXAM VENUE: LAB 1

STREAM: (BLSM)

DATE: 04/05/16

EXAM SESSION: 9.00 – 11.00 AM

TIME: 2 HOURS

Instructions:

- 1. Answer Question ONE (COMPULSORY) and ANY other 2 questions**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE

a) the following data relate to a given stock item

Normal usage	1300 per day
Minimum usage	900 per day
Maximum usage	2000 per day
Lead time	15 – 20 days
EOQ	30,000

Calculate the various control levels

- Reorder level (2mks)
- Minimum level (2mks)
- Maximum level (2mks)

b) given that matrix $x = \begin{bmatrix} 3 & 11 & 6 \\ 9 & -3 & 8 \\ 5 & 0 & 9 \end{bmatrix}$ and $y = \begin{bmatrix} 1 & 2 & 0 \\ 0 & -4 & 5 \\ 5 & -8 & 7 \end{bmatrix}$

Calculate (i) $2X + 3Y$ (3mks)
(ii) $3XY$ (4mks)

c) State four main components of time series (4mks)

d) Differentiate $y = \frac{x^3 + 2x^2 + x}{2x^2 + 3x - 7}$ (4mks)

Determine the present value of £125 payable at the end of each of the year and subjected to a discount rate of 8% (4mks)

e) plot the graphs of

- $y = 2x^2 - 4x - 5$
- $y = 9 + 5x - x^2$

between $x = -2$ and $x = 4$ and find the x values of their point of intersection (9mks)

QUESTION TWO

If 4,000 is deposited into an account paying 6% annual interest compound quarterly, how much will be in the account after 5 years (4mks)

b) Show on a graph paper the region represented by $2x + y > 3$, $x - y \geq 4$ and $y \leq 3$ (10mks)

c. evaluate

$$\int_2^4 (x^3 + 6x^2 - 4x + 1) dx \quad (6mks)$$

QUESTION THREE

A firm is considering two separate capital projects with cash flows as follows

Year	0	1	2	3	4	5
Project 1	(80000)	18000	20000	25000	38000	45000
Project 2	(120000)	30000	50000	50000	50000	15000

- using the NPV criterion and a discount rate of 15% choose the project that is more profitable (6mks)
- find the NPV using a discount rate of 20% and use the result to estimate the IRR for each project (10mks)

- iii. verify that , using the IRR criterious the discussion in (i) is reversed and attempt to explain why (4mks)

QUESTION FOUR

- a. Solve by matrix inverse method (10mks)
- $$x_1 + 2x_2 + 3x_3 = 3$$
- $$2x_1 + 4x_2 + 5x_3 = 4$$
- $$3x_1 + 5x_2 + 6x_3 = 8$$
- b. Two machines A and B are being used to process certain items. The cost function for each machine is
 machine A. $y = 15 + 3x$, machine B : $y = 18 - x + x^2$
 where y = cost of producing x items (£) and x = number of items processed per hour (hundreds)
 if the maximum speed at which both machines can run is 400 items / hour
- i. plot the graph of the two cost functions on the same diagram (6mks)
 - ii. use the graphs to find the range of production for which each item is produced more cheaply
 - a. machine A (1mk)
 - b. machine B (1mk)
 - iii. use the graph to find the total cost during one hour
 - a. of producing 150 items on machine A (1mk)
 - b. of producing 350 items on machine B (1mk)

QUESTION FIVE

- a. Find the derivative of $y = (x^2 + 3)(2x^3 + x^2 - 3)$ (4mks)
- b. State six importance of time series analysis (6 mks)
- c. Below are given the figures of production (in thousand quintals) of a sugar factory

Year	1989	1990	1991	1992	1993	1994	1995
Production (In '000'q + 1)	80	90	92	83	94	99	92

- I. Fit a straight line tend to these figures (8 mks)
- II. Estimate the likely sales of the company during 1996 (2 mks)