



# ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE

FACULTY: SOCIAL & MANAGEMENT SCIENCES

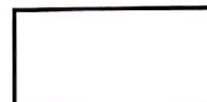
FIRST SEMESTER EXAMINATIONS  
2018/2019 ACADEMIC SESSION

COURSE CODE: MSS 201

COURSE TITLE: BUSINESSES MATHEMATICS

DURATION: 2 HOURS, 30MINS.

INSTRUCTION: Attempt any four (4) questions.



HOD's SIGNATURE

1. A manufacturer determines that the firm's marginal cost and marginal revenue functions are, respectively:

$$MC = C'(x) = 100 - 0.1x$$

$$MR = R'(x) = 100 + 0.1x$$

i. Find the change in revenue that results when the sales level increases from 20 to 30 units. **6 Marks**

ii. If the fixed cost (cost of producing  $x = 0$  units) is #400, find the cost of producing 30 units. **9 Marks**

2a. Find the second derivative of  $f(x) = x^4 + 3x^3 + 6x^2$  **5 Marks**

b. Differentiate  $y = x^2$ , Using First principle **5 Marks**

c. A manufacturer determines that the marginal cost in naira is given by:  $M(x) = x^2 + 3x$ . Find the cost function  $C(x)$ , assuming that the fixed cost (cost when  $x = 0$  units are produced) is #30. **5 Marks**

3. Solve the following equation system by method of matrix inversion

$$X_1 + X_3 = 5$$

$$2X_1 + X_2 = -2$$

$$X_2 - X_3 = 3$$

**15 Marks**

4. The cost of running a generator in Naira varies with time the generator was on. If  $(t) = 10t^2 + 10t - 60$  for the generator to incur no cost at all, how many hour will it run. What is the cost of running the generator for 5 hours? **15 Marks**

5. A haulage company has established that the company's transportation cost function for moving goods from wharf to any part of the metropolis is given as  $(d) = 500(2d + d)$ , where  $d$  is the distance covered. You are required to find;

i. The cost of transporting goods within a distance of 500 meters. **7 Marks**

ii. If a customer paid ₦100,000 what is the distance travelled **8 Marks**

6. Consider a product mix problem in which two sizes of paper towels (product A and B) are to be produced by utilizing three different processes (cutting, folding and packaging). The paper toweling is received from another manufacturing firm in the form of large rolls. These rolls are cut, folded and packaged in two sizes. One unit of product A requires 10 minutes of processing in the cutting dept. 5 minutes in the folding dept. and 1 minutes in packaging dept. One unit of product B requires 6 minutes of processing in the cutting dept. 10 minutes in the folding dept. and 2 minutes in the packaging dept. When sold product A yields a profit contribution of ₦23/unit and product B ₦32/unit. The total available capacity in the cutting dept. is 2500 minutes, in the folding dept. 2000 minutes and in the packaging dept. 500 minutes (note that each product must be processed through all three dept.). These technical specification and the production processes are summarized in the table below. You are required to design and identify the optimal program using graphical method.

Process	A	B	Capacity Constraint
Cutting	10	6	2500 minutes
Folding	5	10	2000 minutes
Packaging	1	2	500 minutes
Profit	₦23	₦32	

15 Marks