



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2022/2023

SCHOOL OF BUSINESS AND ECONOMICS

**BACHELOR'S OF SCIENCE IN ECONOMICS
AND STATISTICS**

BACHELOR'S OF SCIENCE IN ECONOMICS

**BACHELOR'S OF SCIENCE IN FINANCIAL
ECONOMICS**

SECOND YEAR SECOND SEMESTER

COURSE CODE: ECO 2206-1

COURSE TITLE: CALCULUS FOR ECONOMIST II

DATE:

TIME:

INSTRUCTIONS:

Attempt Question one and any other Two Questions

Question One

a. Evaluate

i. $\int \frac{4-3x^2}{\sqrt{x}} \cdot dx$ (3 marks)

ii. $\int_{\pi/2}^{\pi} \sin(3x)\sin(2x) \cdot dx$ (4 marks)

iii. $\sum_{n=0}^{\infty} 2^{-n}$. (3 marks)

b. Show that. (5 marks)

$$\int \frac{1}{a^2+y^2} \cdot dy = \frac{1}{a} \tan^{-1} \frac{y}{a} + c .$$

c. The marginal cost for producing x units of a given product was determined to be given by the formula $MC = 4 + 2e^x$.

i. If the fixed cost was determined to be 100 shillings. Determine the total cost function for the product. (3 marks)

ii. The average cost function for the product. (2 marks)

d. The marginal cost $C'(x)$ and marginal revenue $R'(x)$ are given by $C'(x) = 50 + x/50$ and $R'(x) = 60$. The fixed cost is 200 shillings. Determine the maximum profit. (6 marks)

e. The marginal revenue function of a commodity is $10 + e^{-0.05x}$. Where x is the number of units sold. Find the total revenue from the sale of 100 units. (4 marks)

Question Two

a. The marginal cost of production of a firm is given by $C'(x) = 5 + 0.13x$, the marginal revenue is given by $R'(x) = 18$ and the fixed cost is Shs. 120. Determined;

i. The total cost function. (3 marks)

ii. The total revenue function. (2 marks)

iii. The profit function. (2 marks)

b. The demand function of a commodity is $y = 36 - x^2$. Find the consumer's surplus for $y_0 = 11$. (4 marks)

- c. The demand and supply function of a commodity are $p_d = 18 - 2x - x^2$ and $p_s = 2x - 3$. Find the consumer's surplus and producer's surplus at equilibrium price. **(4 marks)**

Question Three

- a. Determine the area bounded by the curve $y = e^{-2x}$ between the limits $0 \leq x \leq \infty$. **(4 marks)**
- b. Determine the total revenue of a firm given that the marginal revenue function of a firm is $MR = e^{-x/10}$. **(3 marks)**
- c. The demand and supply functions of a given firm are given by $D(x) = 16 - x^2$ and $S(x) = 2x^2 + 4$ are under perfect competition.
- Determine the equilibrium price x . **(2 marks)**
 - Determine the consumer's surplus at the equilibrium prices. **(3 marks)**
 - Determine the producer's surplus at the equilibrium prices. **(3 marks)**

Question Four

- a. Show that $\int \frac{1}{\sqrt{a^2 - x^2}} \cdot dx = \sin^{-1} \frac{x}{a} + c$. **(3 marks)**
- b. Solve
- $\int_{10}^{15} \frac{12}{(x^2 - 9)} \cdot dx$. **(4 marks)**
 - $\int_0^2 2xe^x \cdot dx$. **(4 marks)**
 - $\int_{\pi/3}^{\pi/2} \cos^3 x \sin^2 x \cdot dx$. **(4 marks)**

END
ALL THE BEST