



# MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCES

ESU 305: ENVIRONMENTAL ECONOMICS

DATE: 19/8/2021

TIME: 11:00 – 1:00 PM

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## INSTRUCTIONS:

- i. Answer Question **ONE** and any other **TWO** questions.
- ii. Do not write on the question paper.

## QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Differentiate between the following terms:
- i. An indifference curve and an indifference map (4 marks)
  - ii. Consumer surplus and producer surplus (4 marks)
  - iii. Own-price and cross-price elasticity of demand (3 marks)
- b) The following table provides estimates of average house prices in the Ridgeways and Garden Estate areas of Nairobi County before and after the Northern Bypass was constructed.

Area	House price (\$ '000)	House price (\$ '000)	Number of Houses
	Before	After	
Garden Estate	150	210	15,000
Ridgeways	150	100	4,000

### Calculate the following:

- i. The benefit of the development (4 marks)
- ii. The cost of the development (4 marks)
- iii. The net benefit of the development (4 marks)
- iv. Explain the main causes of market failure (4 marks)
- v. Explain using examples the meaning of “feedback” processes in an ecosystem. (3 marks)

**QUESTION TWO (20 MARKS)**

- a) Explain with the aid of a diagram, the taxonomy of economic values. (10 marks)
- b) Describe, using an illustration, the classification of non-market valuation methods. (10 marks)

**QUESTION THREE (20 MARKS)**

Suppose the supply of and demand for water treatment equipment in Nyeri County at various prices was as follows in 2017, as given in the table below

Price per unit (4)	Quantity demanded	Quantity supplied
40	30	12
60	25	14
80	20	16
100	18	18
140	16	20

- a) Draw the demand and supply curves for water treatment equipment (10 marks)
- b) Calculate the elasticity of demand for a price fall from \$100 to \$80. (10 marks)

**QUESTION FOUR (20 MARKS)**

A survey of 200 visitors to Amboseli National Park, in Kenya, gave the following results: as shown in the table below

Total visit cost (\$)	Number of visits per person per annum 16
16	10
20	8
40	6
80	2

- a) Draw a demand curve for visits to the park as a function of the price, i.e., the travel cost (5 marks)
- b) The survey results indicate that 50,000 people living in the area surrounding the park take on average, five visits to the park in the year. Calculate the consumer's surplus for a single visit to the park for the average person. (5 marks)
- c) Calculate the total consumer surplus for an average visit (5 marks)
- d) Calculate the aggregate consumer surplus per annum for the national park. (5 marks)

### QUESTION FIVE (20 MARKS)

Suppose that the chief resource economist in Kiambu County has estimated the following demand and supply functions for heating fuel.

- Demand:  $P=110-2q^D$
- Supply:  $P=10q^S$

Where  $p$  is price litre,  $Q_d$  and  $Q_s$  are quantities demanded and supplied, respectively.

- Find the equilibrium price and quantity for heating oil (5 marks)
- Suppose the government imposes a carbon tax of 5%, calculate the following:
  - Consumer surplus (5 marks)
  - Producer surplus (5 marks)
  - Deadweight loss (5 marks)