# MACHAKOS UNIVERSITY

**University Examinations for 2018/2019 Academic Year**

**SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT**

**DEPARTMENT OF ENVIRONMENTAL SCIENCES**

**SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR**

**BACHELOR IN ENVIRONMENTAL RESOURCE CONSERVATION**

**ERC 215: NATURAL RESOURCE MAPPING AND CARTOGRAPHY**

**DATE: 22/7/2019** **TIME: 8.30-10.30 AM**

**INSTRUCTIONS;**

**Answer question ONE and any other TWO questions**

**QUESTION ONE (30 MARKS)**

a) Describe the 3 scenarios of GIS table data which can be organized to solve environmental problems (6 marks)

b) Explain the ways in which data can be entered in to GIS platform (5 marks)

c) The data in table below were collected from Bugoma County. Use the data to answer the questions which follow;

| Sample no. | X | Y | Improper disposal of waste (%) | Improper use of pesticides (%) | Improper use of fertilizers (%) | Water pollution (%) |
|---|---|---|---|---|---|---|
| 1 | 38.01° | -0.06° | 11 | 3 | 13 | 15 |
| 2 | 38.13° | -0.08° | 7 | 7 | 12 | 17 |
| 3 | 38.16° | 0.07° | 4 | 9 | 10 | 11 |
| 4 | 38.01° | 0.09° | 9 | 10 | 20 | 16 |
| 5 | 38.08° | -0.01° | 8 | 4 | 15 | 18 |

i. Suggest the problem to be investigated (2 marks)

ii. What are the possible causes of the problem? (3 marks)

iii. Describe how you would organize the data to pose a satisfactory GIS query (7 marks)

iv. Formulate a satisfactory GIS query (3 marks)

v. Give the possible answer (4 marks)

**QUESTION TWO (20 MARKS)**

Use the date below to answer the questions which follow.

Table (a)

| Shape | County | Sub-county | Soil erosion (%) | Deforestation (%) |
|---|---|---|---|---|
| point | Kiambu | W | 20 | 15 |
| point | Kiambu | X | 30 | 20 |
| point | Kiambu | Y | 40 | 10 |

Table (b)

| shape | county | Sub-county | Soil erosion (%) | Deforestation (%) | Poor tillage (%) |
|---|---|---|---|---|---|
| point | Machakos | L | 15 | 20 | 17 |
| point | Machakos | N | 20 | 25 | 19 |
| point | Machakos | P | 10 | 15 | 21 |

Table (c)

| shape | county | Rainfall intensity | Topography |
|---|---|---|---|
| polygon | Kiambu | Very high | steep |
| polygon | Machakos | high | Very steep |

Table (d)

| shape | county | Sub-county | Poor tillage (%) |
|---|---|---|---|
| point | Kiambu | X | 15 |
| point | Kiambu | Y | 30 |
| point | Kiambu | W | 20 |

Table (e)

| shape | county | Sub-county | Soil erosion (%) | Deforestation (%) | Poor tillage (%) |
|---|---|---|---|---|---|
| point | Machakos | S | 20 | 18 | 12 |
| point | Machakos | R | 15 | 30 | 10 |

a) Suggest the problem to be investigated (1 mark)

b) What are the possible causes of the problem? (3 marks)

c) Describe how you would organize the data to pose a satisfactory GIS query (10 marks)

d) Formulate a satisfactory GIS query (6 marks)

**QUESTION THREE (20 MARKS)**

The data below were collected from Kisii County. Use the data to answer the questions which follow;

| Sample no. | Burning of agricultural wastes (%) | Deforestation (%) | Release of methane gas (%) |
|---|---|---|---|
| 1 | 18 | 26 | 5 |
| 2 | 17 | 27 | 7 |
| 3 | 14 | 24 | 9 |
| 4 | 19 | 22 | 2 |
| 5 | 16 | 24 | 4 |

a) Suggest the problem to be investigated (2 marks)

b) What are the possible causes of the problem? (3 marks)

c) Describe how you would organize the data to pose a satisfactory GIS query (5 marks)

d) Formulate a satisfactory GIS query (7 marks)

e) Give the possible answer (3 marks)

**QUESTION FOUR (20 MARKS)**

Discuss how GIS technology can be applied to enhance livestock productivity in Tana River County

**QUESTION FIVE (20 MARKS)**

Discuss how GIS technology can be applied to enhance agricultural productivity in Bomet County