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**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY SCHOOL OF HEALTH SCIENCES**

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN PUBLIC HEALTH**

**SEMESTER 2016/2017 ACADEMIC YEAR**

**CENTRE: KISUMU CAMPUS**

**COURSE CODE: PSP 3314**

**COURSE TITLE: SPATIAL DATA ANALYSIS IN PLANNING**

**EXAM VENUE: STREAM: SPATIAL PLANNING**

**DATE: EXAM SESSION:**

**TIME: 2 HOURS**

**Instructions:**

1. **Answer question 1 ( 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 1**

1. Define the following terms as used in spatial planning
2. Spatial Data Analysis (5 marks)
3. Spatial Data Modelling (5 marks)
4. State **FIVE** advantages of storing spatial data as raster (10 marks)

|  |  |  |  |
| --- | --- | --- | --- |
| dry | dry | wet | wet |
| dry | wet | wet | dry |
| wet | wet | dry | |
| wet | dry |

1. You are provided with the following Data Layers.

Layer1 Layer 2

|  |  |  |  |
| --- | --- | --- | --- |
| steep | | Flat | flat |
| flat | steep |
| flat | flat | steep | steep |
| steep | steep | flat | flat |

1. Produce an output layer 3 from simple overlay of layer 1 over layer 2 (5 marks)
2. Produce an output quad tree with each leaf containing attributes from layer 3

(5 marks)

**Question 2**

1. Explain how to test a model for accuracy using the cross-validation method

(10 marks)

1. State five reasons why we do modelling according to Winterhalder (2002) (10 marks)

**Question 3**

1. Explain five factors that should be considered when choosing a Interpolation Model

(10 marks)

1. Kriging is a local interpolation method used in spatial modelling. State **FIVE** disadvantages of kriging as a spatial interpolator. (10 marks)

**Question 4**

1. A confusion (error) matrix can be used to analyse the relationship between known reference data (truth) and the corresponding results of a classification. Use the matrix provided below to calculate

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | True data | | | | | |
| Classification data |  | Water | Bare Soil | Grassland | Forest |  |
| Water | 12 | 1 | 1 | 0 |  |
| Bare soil | 1 | 14 | 0 | 0 |  |
| Grassland | 1 | 2 | 10 | 4 |  |
| Forest | 0 | 0 | 4 | 12 |  |
|  |  |  |  |  |  |

1. Overall Accuracy (4 marks)
2. Error of commission grassland (3 marks)
3. Error of omission for grassland (3 marks)
4. Explain how the internet supports GIS analysis (10 marks)

**Question 5**

Kisumu City Council wishes to identify land owners who have encroached on the riparian corridors along the River Nyamsaria as it enters Lake Victoria. You are asked to produce a map that delineates these riparian areas, and produce a table that shows landowners who have encroached into these areas. To do this task you are provided with the following data; a network map of streams, a polygon map of the lake, and a polygon map of land parcels.

Create a cartographic model for the problem above (20 marks)