



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENVIRONMENTAL SCIENCE

DEPARTMENT OF ENVIRONMENTAL HEALTH

BACHELOR OF ENVIRONMENTAL SCIENCE HONOURS DEGREE IN PUBLIC HEALTH

GEOGRAPHIC INFORMATION SYSTEMS FOR PUBLIC HEALTH

EPH 2104

Examination Paper

October 2024

This examination paper consists of ---3----- pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: Mr P.L Moyo

**INSTRUCTIONS**

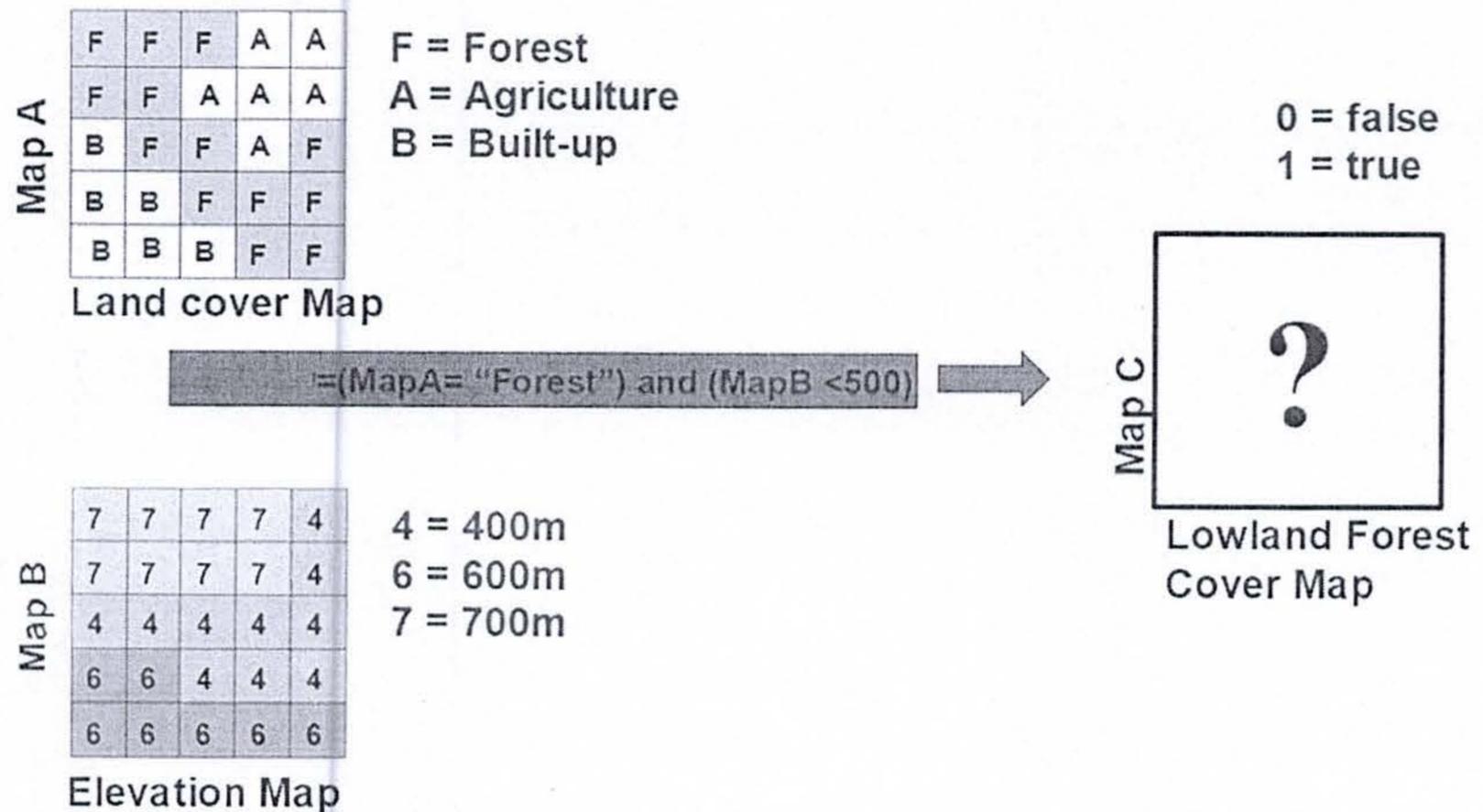
1. Answer **QUESTION 1** and any **THREE** questions
2. Each question carries 25 marks

**MARK ALLOCATION**

| QUESTION     | MARKS      |
|--------------|------------|
| 1.           | 25         |
| 2.           | 25         |
| 3.           | 25         |
| 4.           | 25         |
| 5.           | 25         |
| 6.           | 25         |
| <b>TOTAL</b> | <b>100</b> |

**QUESTION 1 (Compulsory)**

- a) Illustrate using a flow diagram all the functional components of Geographic Information System (GIS) (10)
- b) Distinguish between Vector data format and the Raster data format (in as far as the advantages and limitations of use to represent geographic phenomena) (10)
- c) Complete the following raster logical overlay operator for Map C (Lowland Forest Cover Map) (5)



**QUESTION 2**

Develop a GIS/RS based solutions to help address public health problem of your choice. Critically analyse and identify the main aspects of the problem in your selected case and develop a GIS/RS based approach to assist towards solving the identified aspects of the problem. You need to specify the aim/ objective (s) of your solution, your data needs, the spatial data analysis techniques you will employ in your solution giving justification for your choices/approach (25)

### QUESTION 3

- a) Outline and explain the importance to use Database Management System (DBMS) in GIS (15)
- a) Explain any one neighbourhood function of your choice and how it can be applied in the field of public health using relevant examples (10)

### QUESTION 4

- a) Map visualisation is important to effectively communicate geo-spatial information to users. Outline the important elements that any map output should have (5)
- b) Using appropriate diagrams, explain the rules of topological consistency (10)
- c) Describe any **five (5)** spatial data sources that can be used in GIS (10)

### QUESTION 5

- a) Explain the following terms as they are used in GIS and Remote sensing.
- i. Spatial resolution (2)
  - ii. Spectral bands (2)
  - iii. Atmospheric windows (2)
  - iv. Spectral signatures (2)
  - v. Temporal resolution (2)
- b) Satellites can be classified by their functions. List any **five (5)** different types of satellite (5)
- c) Explain using a diagram the components of a passive sensor in remote sensing (10)

### QUESTION 6

In your specific organisation, you are tasked to set up a Geographic Information System (GIS). Describe and explain the critical components of a GIS you would consider (25)