THE STATE UNIVERSITY OF ZANZIBAR

SCHOOL OF HEALTH AND MEDICAL SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH

FINAL EXAMINATION

SEMISTER II

GEOGRAPHIC INFORMATION SYSTEM (GIS) FOR PUBLIC HEALTH – EH 2221

Date: 19- 08- 2021   Time: 09:00 AM – 12:00 PM

INSTRUCTIONS

1. This paper consists of **TWO** sections, **A** and **B**, which carries 24 and 36 marks respectively.

2. Answer all questions from section A, and any THREE questions from section B.

3. Cellular phones and any other unauthorized materials are NOT allowed in the examination room.

4. **ANSWER EACH QUESTION ON SEPERATE SHEET**

5. This exam consists of five (5) printed pages, including cover page

SECTION A (24 marks)

Answer all questions

1   For each of the item i – v, choose the correct answer(s) among the given   [10 marks]
     alternatives and write its letter beside the item number

i.   The degree to which information on a map or in a digital database matches true or
     accepted values is referred to as:

   A.   Precision

   B.   Accuracy

   C.   Data quality

   D.   Attribute information

ii. What is selective availability?

   A.   The limited window of time during which GPS signals are within line-of-
        sight of a receiving antenna.

   B.   The intentional degradation of GPS signals to deny full access to
        unauthorized users.

   C.   The Department of Defense classification of GPS users with access to the Y-
        code (the encrypted P-code).

   D.   A local tangent-plane coordinate system used to provide flat earth
        approximations for a small area (<12 km).

iii. Which of the following are not characteristics of data quality?

   A.   Coordinate jurisdiction

   B.   Positional accuracy

   C.   Timeliness

   D.   The size-shape ratio of irregular polygons

iv. Which of the following are true?

   A.   Digitizing is defined as converting aerial photographs into maps

   B.   Digitizing involves tracing map features into a computer

   C.   A keyboard cannot be used to digitize maps, only to enter attribute
        information

   D.   A digitizing tablet and mouse are examples of input devices used in
        digitizing

v   Which is NOT characteristic of discrete objects?

    A.   They may include points, lines, and areas

    B.   They completely cover the space

    C.   They can overlap

    D.   They can be counted

vi.   Which of the following statements is true about the capabilities of GIS?

    A.   Data capture and preparation

    B.   Data management, including storage and maintenance

    C.   Data presentation

    D.   All of the above

vii.   Key components of 'spatial data' quality include

    A.   Positional accuracy

    B.   Logical consistency

    C.   Multiuser accessibility

    D.   All of the above

viii.   In the world of GIS, analyzing locations of features by measuring the distance between them and other features is:

    A.   Proximity

    B.   Neighborhood

    C.   Topology

    D.   Location

ix.   By definition a GIS must include:

    A.   A method for storing demographic information

    B.   A method for data storage, retrieval, and representation

    C.   A method for scanning maps to produce raster files

    D.   Data analysis functions

x.   The following are the examples of 'geographic fields'

    A.   Air temperature

    B.   Barometric pressure

    C.   Elevation

    D.   All of the above

2 a)   Write TRUE or FALSE for the following Statements   [10 marks]

        i.   Data can be shared in the process of GIS

        ii.   Shape file is a file format for raster data

        iii.   Data management is typically the largest portion of any GIS project

        iv.   At least 3 satellites are required to obtain a 3D GPS-based position

        v.   Dissolve can be used to extract a portion of a raster dataset based on a template extent.

        vi.   A small-scale map shows a small geographic area

        vii.   Query by attribute is a special techniques that allows a GIS analyst to select features based on their position on the earth's surface relative to features in another layer.

        viii. Before starting the on-screen digitization in the spatial data input, the scanned image must be georeferenced which is the process of assigning real-world coordinates to each pixel of the raster image.

        ix.   The attribute information for vector data are stored in pixel.

        x.   Performing the same analysis in two different GIS software packages will always give the same results

  b)   Enlist four (4) ways in which spatial data can be collected   [4 marks]

Answer any THREE questions, each question carries 12 marks.

3 a) What is GIS   [2 marks]

   b) Why is it useful to view GIS as a process rather than merely software or   [5 marks]
       hardware?

   c) With examples, clarify the statement that "the rapid increment of GIS is its   [5 marks]
       potential use in a wide array of applications"

4 a) Explain the difference between: [4 marks]

       i.   Precision and Accuracy?
       ii.   Positional accuracy and Attribute accuracy?

   b) List at least five problems that arise when "paper" maps are converted to   [4 marks]
       "digital" maps.

   c) What are meta data, and why are they important? Give four reasons   [4 marks]

5 a) What is the fundamental difference between   [6 marks]

       i.   Attribute and Spatial data, give examples. (at least one difference)
       ii.   Raster and Vector data (three (3) differences)

   b) Briefly describe at least three sources of GPS signal error, and ways to mitigate [6 marks]
       or reduce those errors

6 a) What is Spatial Analysis.? Give examples   [2 marks]

   b) Explain the role of each of the following tools as applied in spatial analysis.   [10 marks]

       i.   Clipping
       ii.   Dissolve
       iii. Query by attribute
       iv.   Query by location
       v.   Buffering