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UNIVERSITY EXAMINATIONS 2023/2024

FOURTH YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

CIT 3450: GEOGRAPHIC INFORMATION SYSTEMS

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

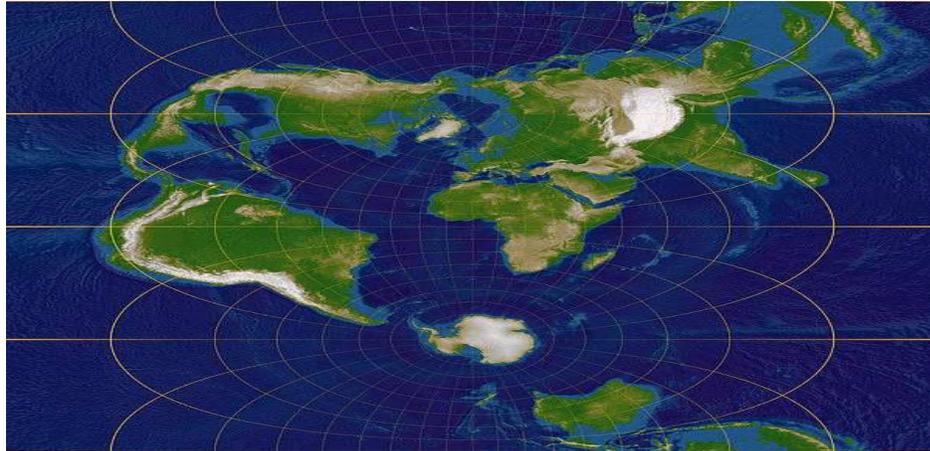
- With the help of a sketch map in each case, differentiate between orthographic and thematic maps. [6 Marks]
- Explain FOUR disadvantages of Raster image formats [4 Marks]
- Explain the steps how a GPS (Global positioning system) works. [5 Marks]
- Differentiate between intelligent GIS vs. Internet GIS [4 Marks]
- Why is spatial interpolation important when developing GIS maps? [2 Marks]
- Below is a Transverse Mercator map projection of the earth. Use it to answer the questions below



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED



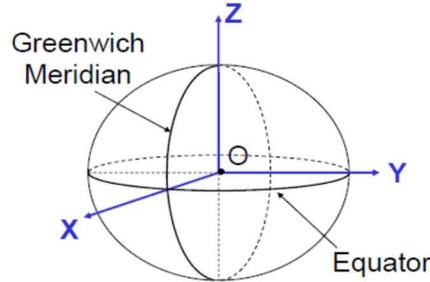
- i) Outline the main difference between Transverse Mercator projection and the standard Mercator projection [2 Marks]
 - ii) Where are the coordinates of the center, left border, and right border in the above map [3 Marks]
- g) Explain FOUR roles of computer hardware in GIS, naming an example in each case [4 Marks]

QUESTION TWO (20 MARKS)

- a) A globe of radius 40.3cm was developed to represent the earth. Calculate the scale that was used (assume the radius of the earth is 5370Km). [2 Marks]
- b) With the aid of sketch diagrams, describe FOUR line topological errors leading to inaccuracy and imprecision in GIS data. [8 Marks]
- c) With reference to tessellations and Tabular database design, answer the following questions.
- d) Draw a simple sketch map with box tessellation, then use an irregular tessellation to represent the same sketch map. Explain your choice for the irregular tessellation chosen. [5 Marks]
- e) Represent the first sketch map on a database with at least SIX fields. [5 Marks]

QUESTION THREE (20 MARKS)

a) Below is a diagram, showing global Cartesian coordinates. Use it to answer the questions below. (Take the radius of the earth to be 6370KM)



- i. Describe THREE types of coordinates systems used during referencing of the global Cartesian coordinates and their importance. [6 Marks]
 - ii. Calculate the distance from 30° N 90° W, to 10° S 90° W [3 Marks]
 - iii. Calculate the distance from 30° N 90° W, to 30° N 90° E [3 Marks]
 - iv. The globe to earth ratio of 1:10,000,000 was constructed. What was the diameter of the constructed globe? [3 Marks]
- b) Explain THREE advantages and TWO disadvantages of TIN (Triangular irregular networks) data format. [5 Marks]

QUESTION FOUR (20 MARKS)

- (a) Explain FIVE advantages of raster image data [5 Marks]
- (b) Using an example in each case, explain FOUR types of scales used for measuring geographical data [8 Marks]
- (c) Describe the following GIS file formats.
 - i) BIL (Band Interleaved) [2 Marks]
 - ii) SVG (Scalable Vector Graphics) [2 Marks]
 - iii) MrSID (Multi-resolution Seamless Image Database) [3 Marks]

QUESTION FIVE (20 MARKS)

With reference to GIS maps development, answer the following questions: -

- i. Draw a vector orthographic map of dimensions 15cm by 15cm, to represent an area of 1km by 1km. let the map have at least 10 geographical / physical features [5 Marks]
- ii. Use tessellations of your choice to redraw the map, ensure the map is similar to the one in (i) above [5 Marks]
- iii. Include a favorable scale on the map [2 Marks]
- iv. From your map, explain THREE visual effects that differentiate one feature from the other. [6 Marks]
- v. Which type of scale have you used on the map? explain [2 Marks]

