End Exam **29th Feb 2024**

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY

Introduction to Spatial Science and Technology

Time:90 minutes ***Total Marks:* 40**

- Answer the questions section wise.
- If you make any assumptions, state that clearly while answering.

Section: I Answer all the following questions (1mark x 6 = 6 Marks)

1. Which of the following is not a data error that occurs during the acquisition of the data
   A. Instrument errors
   B. Errors due to digitization
   C. Data entry errors
   D. Image interpretation error
2. Indicate the type of attributes these data fall in –
   A. Rainfall data
   B. Education facilities like University, High School, Primary School, etc.
3. Which wavelength region is used in the detection of vegetation fires from satellite data?
4. List any two water and climate-related disasters in which you think Spatal sciences can be of use.
5. Why can we consider NDVI as a model of a region?
6. During which season do we need to be more alert, as it is the Peak forest fire season in India?

Section: II Answer any 7 of the following questions (2mark x 7 = 14 Marks)

7. An Electricity company is planning to adopt GIS in their functioning. Do they really need a GIS? Outline the arguments you would present.
8. What does one mean by primary data capture methods? Name the ones used for vector data collection.
9. What variables are useful in predicting 'fire spread' and which of these can be handled as spatial objects?
10. How are cartographic queries different from Spatial queries? Use one example each to briefly explain.
11. You have to do an operation on a raster dataset to get the crop suitability map depending on total annual rainfall, average temperature, soil water holding capacity. Would you prefer a BIP or BIL data format for these data layers? State why.
12. What does one mean by attributes? List the different types of attributes.
13. How to characterize the quantity and quality of water?
14. What does one mean by Geo-services? Briefly explain with an example.

Section-III Answer all the questions (3mark x 5 = 15 Marks)

15. List and state in 1 line each of the different levels of data abstraction that geospatial data models employ?
16. Consider that the position of all mobile phones are available at a frequency of 1min.
    (a) How will you store the spatial and non-spatial components of this data?
    (b) Mention an Use case and indicate how you will analyse this data for that use case.

17. There is a need to study the changes in the water body over the last 10years. From what you have learnt in this course, what are the steps that you will employ to report this? Use a flowchart and explain.
18. What are map projections and why do we need them? What properties do these map projections try to preserve and can they ensure all of them are accurately preserved?
19. There is a need to generate digital GIS data from traditional paper and cloth maps (pre-1900 maps). Justify which method you will choose for this task and the challenges you may face.

Section: IV Answer any ONE of the following (5mark x 1 = 5 Marks)

20. The urbanisation of a given city is expected to happen in the next decade at a rapid pace. This city is also located near a river and the sea coast.
    (a) Why do you think this is a spatial problem?
    (b) What thematic data layers will you need? List the data model for each thematic data and the attributes it will have.
    (c) How will you model the spread? [Hint: Present a flowchart for this]
21. A climatic study of the changes in vegetation is being conducted across India. Describe in detail you will approach such a study if it is based on satellite data as the primary information source. Also mention the spatial data characteristics and changes you will study.