This Question paper consists of one page. **Attempt Questions and/or Sub-Questions to score maximum marks.** Please print all your answers in the Answer Booklet provided. Scientific Calculator is allowed.

QUESTION 1. Write briefly about
    (i) Geographical Information Science (GISci)   **[4 marks]**
    (ii) Location Significance Index   **[4 marks]**
    (iii) Dilation and erosion distances between the spatial objects (X^i) and (X^j) **[4 marks]**
    (iv) Dilation and erosion distances between the spatial fields (f^i) and (f^j) **[4 marks]**
    (v) Digital Elevation Model   **[4 marks]**

QUESTION 2. Explain about the retrieval of unique connectivity networks such as the valley and the ridge connectivity networks from the Digital Elevation Models (DEMs) via morphological skeletonization.   **[10 marks]**

QUESTION 3. Write briefly about spatial relationships between the spatial objects. Explain quantitative spatial relationships between the spatial objects and how these quantitative relationships can be compared with that of logical-based spatial relationships.   **[10 marks]**

QUESTION 4. Explain the process of transforming a binary spatial object into a spatial function via distance functions, and the threshold decomposition of such a spatial function.
    [10 marks]

QUESTION 5. What is Cartogram? Give a brief account of the generation of variable-specific cartograms. How to generate variable-specific cartograms via a mathematical morphological approach.   **[10 marks]**

QUESTION 6. Explain about transforming sparse elevation contour data into denser elevation contour data with respect to hierarchical morphological interpolations with the support of equations, algorithms and illustrations.   **[10 marks]**

QUESTION 7. What is grayscale morphological interpolation? How grayscale morphological interpolation can be applied to transform sparse spatial field data into denser spatial field data with the support of equations, algorithms and illustrations.   **[10 marks]**

QUESTION 8. What is spatial interaction? Write about the classical social gravity model in the context of computing variable-specific spatial interactions between the political (geographical) units. Explain the involvement of asymmetric distances between (X^i) and (X^j), and the location significance of (X^i) and (X^j) in computing a more realistic form of interactions than that of classical social gravity models that yield symmetric interactions.
    [10 marks]

END OF PAPER