

INDIAN STATISTICAL INSTITUTE

FOURTH SEMESTER EXAMINATION, 2015/17 SESSION

ELECTIVE PAPER ON GEOGRAPHICAL INFORMATION SYSTEMS

(MASTER IN LIBRARY INFORMATION SCIENCE)

02nd May 2017

10:00AM-01:00PM

(3 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 1 page.
2. Attempt all questions to score maximum.
3. Please print all your answers in the Answer Booklet provided.
4. Scientific Calculator is allowed.

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- Q1. Write briefly about the following:
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| (a) Spatial autocorrelation | [3 marks] |
| (b) Ranks for pairs of spatial fields | [3 marks] |
| (c) Spatiotemporal modelling | [3 marks] |
| (d) Mathematical maps Vs. Geographical maps | [3 marks] |
| (e) Histogram equalization | [3 marks] |
- Q2. What is Geographical Information Science (GISci), and its uses in planning and developing spatial social policies? [5 marks]
- Q3. Given 29 states of India, explain a procedure on how to cluster those 29 states in to k -groups, where k is the number lesser than 7. [10 marks]
- Q4. Given a Digital Elevation Model (DEM), in other words a 2-D function depicted as $f(x, y)$ denoting elevations at spatial positions (x, y) , how do you extract valley and ridge connectivity networks. Provide steps involved in the algorithm with supporting equations and illustrations. [10 marks]
- Q5. Write full set of equations involved in computing the median and dual median between $f(x, y)$ and $g(x, y)$ being the source and target spatial fields respectively. Show example source and target spatial fields of your choice, and compute median and dual median. [10 marks]
- Q6. Across the geographical space, there are four locations, denoted as X_1, X_2, X_3, X_4 such that $\bigcap_{i=1}^4 X_i = \phi$. The temperature values recorded respectively at X_1, X_2, X_3, X_4 are 10, 20, 30, 40 degrees centigrade. Write an algorithms to convert such location-specific data into contiguous four-zones map, and explain the process with illustrations. [10 marks]
- Q7. What is the importance of deriving a strategically significant location within a spatial system containing several locational-objects. How to designate each spatial object within a spatial systems with ranks ranging from highly significant to least significant. [10 marks]

End of the Paper.