

National Exams May 2008

04 Geom A7 Geospatial Information Systems

3 hours duration

NOTES

- 1 If doubt exists as to the interpretation of any question the candidate is urged to submit with the answer paper a clear statement of any assumptions made
- 2 This is an OPEN BOOK EXAM
Any non communicating calculator is permitted
- 3 All 12 questions constitute a complete exam paper
- 4 Each question is of varying value
- 5 Most questions require an answer in essay format Clarity and organization of the answer are important

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Marks

- 10 1 List five justifiable applications that use computer based geospatial information systems (GISs)? (5 x 2 marks)
- 10 2 Define the following in the context of GIS (5 x 2 marks)
- a an entity
 - b an attribute
 - c precision
 - d accuracy
 - e topology
- 5 3 What is the purpose of georeferencing data when using a geospatial information system?
- 12 4 What are the relative advantages of using vector based versus raster based data structures for geospatial information systems in terms of (6 x 2 marks)
- a data storage
 - b point precision
 - c feature representation
 - d feature searching
 - e change detection
 - f using satellite digital image data
- 5 5 What type of 2 D coordinate transformation should be used when four corners of a map sheet are digitized? Explain your choice
- 10 6 During the process of merging several data sets into a GIS it is determined that there are residual geometric distortions. Detail the procedure you would use to deal with (i.e. eliminate and/or minimize) these differences
- 8 7 When would you use the following for representing geospatial data locations
- a 3 D Cartesian coordinates (e.g. E N h)?
 - b 3 D Geodetic coordinates (e.g. ϕ λ h)? (2 x 4 marks)
- 5 8 What are the factors that should be considered when choosing a map projection for displaying GIS data?
- 10 9 In the context of a GIS (2 x 5 marks)
- a What is a TIN?
 - b What is an entity relationship data model?
- 5 10 What is the difference between spatial (i.e. geometric) and attribute uncertainty?
- 10 11 In terms of quality control explain (2 x 5 marks)
- a How data uncertainty is represented in a GIS?
 - b How and why lineage is important for tracking data history in a GIS?
- 10 12 How would you use a GIS to (2 x 5 marks)
- a select a location for a retail store?
 - b determine properties affected by a floodplain?