

**UNIVERSITY OF SOUTH AUSTRALIA**

DIVISION OF INFORMATION TECHNOLOGY, ENGINEERING AND THE  
ENVIRONMENT

School of Natural and Built Environments

Semester 1, 2004

**Geographical Information Systems 5: GEOE 3012**

Time Allowed: 3 hours + 10 minutes reading time

**General Instructions to Candidates**

All questions are of equal value. Marks for part of questions are as indicated.

Answer any **TWO** questions from **Section A** and any **TWO** questions from **Section B**.

Please ensure the front of your answer books are completed with your name, student I.D. number, course and section of the examination.

<b>SECTION A</b>
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**QUESTION 1 [25 marks]**

- a) Describe the way in which fuzzy membership functions are generated using the sematic import method.  
(15 Marks)
- b) Define the fuzzy operators AND, OR, SUM, PRODUCT, and GAMMA and provide relevant examples of their use in a GIS application.  
(10 Marks)

**QUESTION 2 [25 marks]**

- a) Describe the principle underlying the use of Fuzzy K means as a technique for deriving fuzzy membership functions.  
(13 Marks)
- b) Monthly sales data for detached residential houses is available over a large metropolitan area. The factors affecting sale price are many and varied and no one model describes all the variability in the data. Discuss the how an Artificial Neural Network (ANN) could be used to “learn” the relationships between the data and then be used as a mechanism to predict sale price at new locations.  
(12 Marks)

**QUESTION 3 [25 marks]**

- a) Discuss the main issues in the application of GIS to multi-temporal problems.  
(11 Marks)
- b) Expert systems derive their inputs from the coding of expert knowledge. Discuss the typical models for the combination of expert knowledge within a spatial environment.  
(14 Marks)

<b>SECTION B</b>
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**QUESTION 4 [25 marks]**

- a) What are the characteristics of a Project that distinguish it from an ongoing operational program?  
(10 marks)
- b) Discuss, and explain, the importance of the following issues in relation to the management of a project:
1. Understanding who the stakeholders are and what they want;
  2. Building and maintaining a cohesive team; and
  3. Using time effectively.

(15 marks)

**QUESTION 5 [25 marks]**

- a) Describe in detail the four main stages of a generic project life cycle.  
(10 marks)
- b) Explain why you either agree or disagree with the statement that ‘as the project life cycle progresses, the cost of change increases whilst the scope for change decreases.’  
(10 marks)
- c) With the aid of a diagram, illustrate the amount of effort (resources) required and the potential for adding value to a project as a function of time.

(5 marks)

**QUESTION 6 [25 marks]**

- a) One of the key attributes that a successful project manager must have is leadership skill. Discuss the qualities of a good project leader and how a good leader would operate in a project environment.  
(15 marks)
- b) How does the project manager achieve a balanced approach to project planning?

(10 marks)