

**UNIVERSITY OF SOUTH AUSTRALIA**

**School of Geoinformatics, Planning & Building**

**Spatial Information Systems 3 - 10239  
& Spatial Systems 2 - 10226**

**DEFERRED  
EXAMINATION**

**Semester 1, 1999**

Time Allowed: 2 hours + 10 minutes reading time

**General Instructions to Candidates**

**Total Marks = 90**

Attempt any three questions of the five questions provided.

Marks for each part question are indicated in brackets.

This is a closed book examination.

Please ensure front of answer book is completed with your student name, student I.D. number and course.

### Question 1

- (a) Outline the advantages and disadvantages of the vector and raster approaches to GIS. (8)
- (b) Describe in detail the construction of the ArcInfo PAL and ARC files in a polygon coverage. Where necessary use an accompanying diagram showing a simple polygon structure. (14)
- (c) Briefly summarise the name and purpose of each file in a typical ArcInfo polygon coverage. (8)

### Question 2

- (a) Describe the four main types of image formats. (6)
- (b) Outline the structure of the BSQ,BIL & BIP image formats. (7)
- (c) Describe the world naming convention approach to georeferencing images in ArcView. What transformation is used. (10)
- (d) Briefly summarise the name and purpose of each file in a typical ArcInfo grid. (7)

### Question 3

- (a) With a brief description and supporting diagrams, discuss the operation of the following ArcInfo vector overlay functions:

- Clip
- Update
- Union
- Identity
- Intersect

Which of these functions replicate the generic AND and OR operators. (20)

- (b) Using an example scenario, describe the two main approaches to GIS raster modelling. (5)
- (c) What is the main advantage of GIS topology. (5)

#### Question 4

- (a) Provide a detailed algorithm of the steps a GIS will undertake to clean & build topology.
- (b) Describe the point-in polygon algorithm.

(30)

#### Question 5

- (a) Derive the uncertainty (random error) formula for the following models:
  - (i)  $f(x,y,z) = 13.x.y.\cos(z)$
  - (ii)  $f(x,y,z) = (x+2.y).z^3$
- (b) What two assumptions are made in relation to deriving the uncertainties in the approach you have used in part (a) above.

(25)

(5)