

UNIVERSITY OF FORT HARE

**GIS TECHNIQUES
GIS 222**

SUPPLEMENTARY EXAMINATION

JANUARY

2019

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Time: Three (3) Hours

Subject: GIS 222

Marks: 100

This paper consists of 4 pages including the cover page

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INSTRUCTIONS

- **This paper consists of three sections and six questions in total**
 - **Answer *all* questions on the answer sheet provided**

SECTION A: [30]

Question One	[15]
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- 1.1 Explain and give an example of the South African map reference system. (10)
- 1.2 List and draw 5 common data errors. (5)

Question two	[15]
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- 1.3 Explain how GPS points are used to transform digitized data. (10)
- 1.4 Convert / Calculate the following:
- a. From decimal number angle to degrees, minutes and seconds:
55.6589° (1)
 - b. From degrees, minutes and seconds to decimal number angle:
55°39'34" (1)
 - c. A map with a scale of 1:30 means that 1cm on the map represents a distance of 30cm on the ground. What is the corresponding conversion for area on the map vs. ground? (2)
 - d. A road measure 6cm on a 1:50 000 maps. How many kilometers is this in reality? (1)

SECTION B: [40]

Question three	[15]
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- 3.1 Give three examples of discrete data measured in GIS. (3)
- 3.2 List two data models. (2)
- 3.3 Explain why a database should be considered a data model in GIS. (3)
- 3.4 Draw a basic raster data model include all labels describing the structure of a raster. (4)
- 3.5 You are required to create a map of the drought intensity in the municipality. These values vary usually from -3 to 3 (including decimal numbers) if they were computed using the SPI model. What number type and what raster type do you think is appropriate? (3)

Question four	[10]
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- 4.1 Use the following criteria to recode it the raster image below
- a. Between 1 and 5 = 1
 - b. Between 6 and 8 = 2
 - c. Between 9 and 12 = 3

1	2	3	6	5	8	6	9
2	4	5	5	6.5	4	5	6
1	5	3	6	1	7	5	6
4	2	7	8	3	9	10	8
7	3	2	5	2	11	8	8
3	5	4.5	7.5	3.6	5.9	4.95	7.95
2	6	5	4	2	5.4	5	4.6
1	6	4	4	1	6.3	4.3	4.3
3.5	5.5	8.5	3	3.35	6.55	8.95	3
4.5	2	5	3.5	3.75	1.7	5.9	3.05

Question five

[15]

5.1 Explain using diagrams three most important spatial relationships (6)

5.2 when building topology, there are three types of processes. Explain these processes using diagrams, including a real-world example. (9)

SECTION C: [30]

Question six

[30]

6.1 explain in details using diagrams how point, line, and polygon rasterization work. (15)

6.2 Explain using diagrams vector overlay using AND, OR, and "Not" Boolean operator. (15)

*****The End*****

Life comes at a price, and that price can only be paid today