UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND

PLANNING

MAIN EXAMINATION, MAY 2018

B.A, BSc, BASS, B.Ed.

TITLE OF PAPER: INTRODUCTION TO GEOGRAPHICAL
INFORMATION SYSTEMS

COURSE NUMBER: GEP 221

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS: 1. ANSWER THREE QUESTIONS

- 2. QUESTION 1 IS COMPULSORY

3. IILUSTRATE YOUR ANSWERS WITH

EXAMPLES AND CLEARLY DRAWN DIAGRAMS

WHERE APPROPRIATE

ALLOCATION OF MARKS: QUESTION 1 (COMPULSORY) CARRIES

40 MARKS WHILE THE REST CARRY

30 MARKS EACH

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION IS

GRANTED BY THE INVIGILATOR

GEP 221: INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEMS – MAY 2018

SECTION A: COMPULSORY

QUESTION 1

As a GIS specialist for a consultancy company, a client has tasked you with producing a population difference map for Somntongo Constituency for the years 1997 and 2017. For the task at hand, the following datasets have been made available to you:

- A shapefile of the constituencies of the country projected to WGS84
- A national population raster map for the year 1997 projected to WGS84
- A national population raster map for the year 2017 projected to LO31+

a) Fully outline, using examples and illustrations where appropriate, the steps you would undertake, and the GIS operations you would perform in order to produce the 20 years population difference within the constituency for the client, using ArcMap Version 10.5 software. (35 marks)

b) Briefly explain how you would aid your client to make sense of the product so as to understand the population differences within the constituency. (5 marks)

(40 Marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

a) Outline the steps you would undertake to introduce data that was in Microsoft Excel format (.xlsx) into a GIS, and saving the output as a shapefile. (15 marks)

b) What is a projection, and why is it important in GIS? (15 marks)

(30 Marks)

QUESTION 3

Using examples, identify and discuss five main questions GIS can be used to answer.

(30 Marks)

QUESTION 4

a) Define topology. (5 marks)

b) For the topology table (Table 1) given below, draw the topology diagram represented by the data. (25 marks)

Table 1: Topology table

Polygon	Arcs
O	-1 4 8 3 -7 -5 -6
A	1 6 -10 -2 -4
B	2 -9 -3 -8
C	5 7 9 10

Hint: Arcs shown with a negative sign (-) lead away from the node

(30 Marks)

QUESTION 5

With reference to an application of your choice, discuss how GIS has been useful in solving a spatial analysis problem.

(30 Marks)