UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT & ENERGY STUDIES

MODULE	**GGR8X57 / S2GISQ1** **Geo-informatics 1: Geographic Information Systems**
CAMPUS	**APK**
EXAM	**JUNE 2019**

DATE 01/06/2019

SESSION 08:30 – 12:30 **DURATION** 3 HOURS

MARKS 100

Internal Examiners

Prof. S.G. Tesfamichael
Ms. T. Mugwena

External Examiner

Dr. E. Adam (Wits)

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This paper consists of three pages including cover page

Instruction: Answer **FIVE** questions.

Section A (Ms Mugwena)
Answer question 1.

Question 1

i. Differentiate between a database and a database management system (DBMS). (5)

ii. Discuss what the statement “Garbage in, Garbage out” means when dealing with GIS data acquisition (5)

iii. The physical distance measure operation uses cells as units in measurements. If you are given a project to find suitable habitat for Rhinos in the Kruger national park, discuss how you would use physical distance measure tools to find the suitable habitat. (10)

[20]

Section B (Prof Tesfamichael)
Answer any FOUR questions from this section.
Start answering each question on a new page.

Question 2

Discuss a detailed methodology to identify a suitable site for building a new shopping mall using the following as determining factors. Your methodology must flow logically and illustrate hypothetical scenarios of the factors.

- Far enough from existing malls.
- Within a certain distance of a main road.
- Must not be within a critical ecological zone (river, wetland, conservation area).
- Must be at least 2 hactare in size.

[20]

Question 3

You are asked by a manager of a nature reserve to determine if the spatial patterns of a certain animal is related to water and plant type distribution. Discuss how you would apply spatial pattern analysis to answer the question.

[20]

Question 4

Spatial interpolation is used to estimate values at locations where measurements are not taken, and thus helps in creating spatially continuous values. Discuss A UNIQUE interpolation method for each of the following application areas. Your discussion must include the sampling strategy and justify the choice of the interpolation method.

- Social science or economics
- Natural science or physical geography

[20]

Question 5

Discuss the procedures involved in viewshed and watershed analyses by using relevant examples. Include the factors that influence the outputs of viewshed and watershed analyses.

[20]

Question 6

Residential property values depend on various physical, social and economic factors. Discuss how GIS can be used to support residential property valuation by using a specific example from each factor.

[20]

Question 7

Soil erosion is a major problem affecting vulnerable rural communities. You are given the task of quantifying the rate of soil loss using the following equation in a given area as part of the initial step to fight the problem. Discuss a GIS based approach to resolve the problem by detailing the processes from data collection through to the final product.

$$A = R \times K \times LS \times C \times P$$

where, A is soil loss
R is rainfall erosivity factor
K is soil erodibility factor
LS is combined slope and length of topography factor
C is vegetation cover management factor
P is conservation practice factor

[20]