



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BSC IN CIVIL ENGINEERING

ECE 2517: GEOSPATIAL INFORMATION SYSTEMS (GIS)

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: 16 May 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID

This paper consists of five questions. Attempt question ONE (Compulsory) and any other TWO questions.

Question One (30 Marks)

- (a) Briefly discuss the following terminologies as used in GIS;
 - i. Data Types **(4 Marks)**
 - ii. Data Representation **(6 Marks)**
 - iii. Accuracy and Precision **(2 Marks)**

- (b) GIS can be construed to revolve around key activities while interacting with a spatially related phenomenon. Discuss these key GIS activities (otherwise referred to as 4M's) demonstrating their relevance to building and civil engineering discipline. **(12 Marks)**

- (c) Using appropriate examples (from building and civil engineering discipline), Outline any SIX applications areas of GIS **(6 Marks)**

Question Two (20 Marks)- Answer either part a or part b

- a) GIS can be understood as the subsystem nature within the framework of a main system (structural perspective of GIS). Using a descriptive diagram and relevant examples discuss the GIS Subsystem **(20 Marks)**
- b) There are five essential elements that a GIS must contain which translate in GIS workflow (Procedural perspective of GIS). Using a descriptive diagram and relevant examples discuss the GIS Workflow **(20 Marks)**

Question Three (20 Marks)

- a) i.) State the main objective of spatial data analysis. **(2 Marks)**

ii.) You have been provided with spatial data for households and major roads within Mombasa County. It is assumed that people living within 100 m of the major roads are at risk of contracting cancer due to traffic pollution. Explain how you would use GIS to identify and obtain a count of the households lying within the danger zone. **(8 Marks)**

- b) Demonstrate the relationship among the FIVE components of a GIS **(10 Marks)**

Question Four (20 Marks)

Discuss AT LEAST the six MAIN Implementation phases as a principal consultants hired by an International Engineering Company wishing to set up GIS lab to improve its local operation. **(20 marks)**

Question Five (20 Marks)

- (a) GIS data can be represented in various ways. In your own words explain concept of Spatial data modelling **(2 Marks)**
- (b) Briefly outline SIX components of spatial data quality in GIS environment **(6 Marks)**
- (c) Using appropriate examples distinguish between categorical and spatial relationships as concepts of information organization in GIS **(12 Marks)**