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(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF SCIENCE IN RENEWABLE ENERGY TECHNOLOGY

COURSE CODE: RET 331

COURSE TITLE: GIS FOR RENEWABLE ENERGY

DATE: 06-12-2022 **TIME: 15:00-17:00**

INSTRUCTIONS TO CANDIDATES

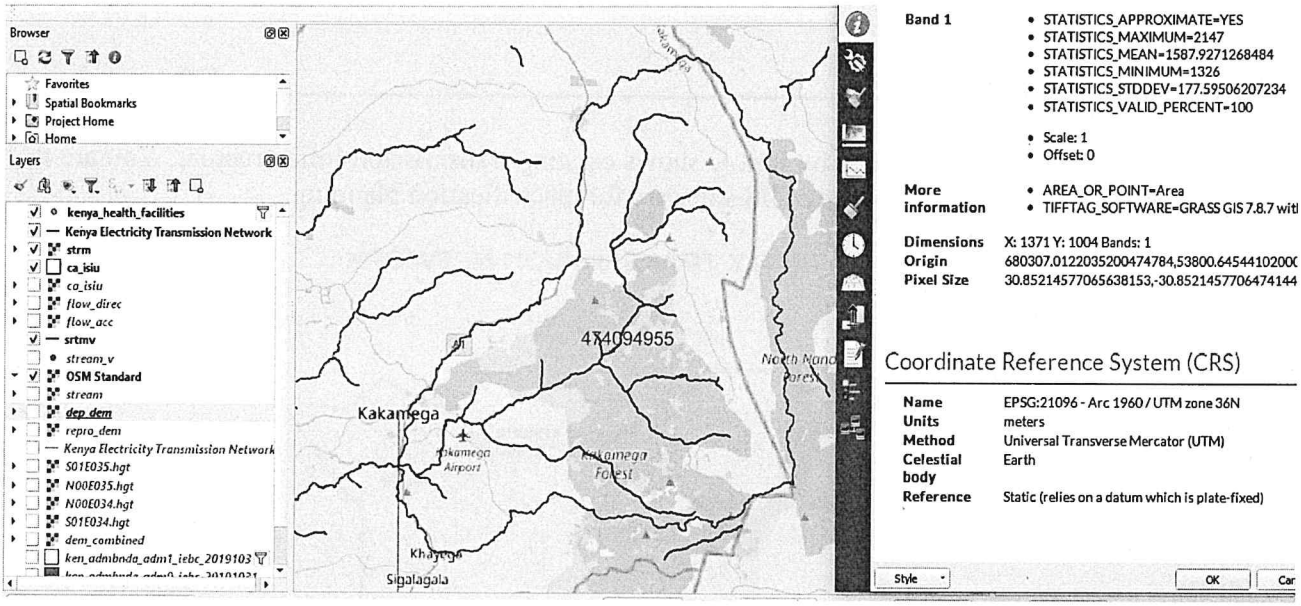
1. This paper consists of **FOUR** questions
2. Answer Question **ONE (Compulsory)** and any other **TWO** Questions
3. All symbols have their usual meaning
4. Take the Radius of Earth as approximately **6,371 km**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over

v. Compute the theoretical discharge/runoff given the area receives an annual rainfall of 2400 mm **(2 marks)**



b) With an aid of a spectral signature curve, explain why the spectral signature of turbid water exhibits higher values unlike in clear water and the importance of such **(4 marks)**

QUESTION THREE [20 marks]

3)

a) A shuttle radar using an InSAR sensor with an instantaneous field of view of 1.51 milliradians was used to detect elevation on the earth's surface to create a digital elevation model for the earth.
   i. Explain the technology in (a) in terms of remote sensing platforms **(2 marks)**
   ii. Give two advantages of the technology in (b) above **(2 marks).**
   iii. Calculate the spatial resolution for the sensor if the satellite was flying at an altitude of 20,000 m **(2 marks).**
   iv. Compare the spatial resolution if the satellite is redeployed at an altitude of 10,000m **(2 marks)**
   v. What relationship can be deduced between the spatial resolution of the sensor and satellite altitude **(2 marks)**

b) Distinguish between spectral and spatial resolution **(3 marks)**

c) Landsat 7 (8 spectral bands) and Landsat 8 (11 spectral bands). Compare their spectral resolution with reference to the electromagnetic spectrum **(2 marks)**

d) Outline the components of a geographic information system (GIS) **(5 marks)**