MAASAI MARA UNIVERSITY

SUPPLEMENTARY UNIVERSITY EXAM EXAMINATIONS 2021/2022 ACADEMIC YEAR FOURTH YEAR FIRST SEMESTER

SCHOOL OF NATURAL RESOURCE, TOURISM AND HOSPITALITY

BACHELOR OF ENVIRONMENTAL STUDEIS (EARTH SCIENCES)

COURSE CODE: EES 4158
COURSE TITLE: GEODETIC REFERENCE AND NETWORK ANALYSIS

DATE: 4ᵀᴴ APRIL, 2022   **TIME: 11:00 - 1:00 HOURS**

SECTION A: 25 MARKS - ANSWER ALL THE QUESTIONS IN THIS SECTION

1. Define vernal equinox and autumnal equinox **(5 marks)**
2. What do you understand by rising of a celestial body? **(5 marks)**
3. Describe an observers' local meridian and explain every observer's local meridian is unique **(2 marks)**
4. Briefly explain the importance of the astronomical coordinate systems **(2 marks)**
5. Explain Kepler's second law of planetary motion (**3 marks**)
6. Explain the significance of the following events on our life on the earth surface.
   a) International date line **(2 marks)**
   b) An Equinox **(2 marks)**
   c) Earth's rotation on its axis **(2 marks)**
   d) Earth's revolution on its orbit **(2 marks)**

SECTION B: 45 MARKS -CHOOSE ANY THREE (3) QUESTIONS

7. (a) Discuss how the advent of spacegeodetic techniques and the rapid improvement of communication techniques and capacities change the scope of geodesy? **(12 marks)**
   (b) How does this change in scope, change the role of geodesy in Earth Sciences? **(3 marks)**

8. (a) Describe three height system related to gravity **(12 marks)**
   (b) Highlight Three examples of reference ellipsoids **(3 marks)**

9. (a) Suppose you are using Euler angle rotations to manipulate the orientation of an object by rotating around the coordinate axes. Suddenly, you encounter Gimbal lock. Describe the effect of Gimbal lock and state how you would "break the lock". **(5 marks)**
   (b) Describe two methods to derive information about the Earth's gravity field from space. Make sure that for both methods you mention what quantity/quantities is/are observed. **(10 marks)**

10. (a) Describe Three height system related to gravity **(12 marks)**
    (b) Highlight Three examples of reference ellipsoids **(3 marks)**

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