MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FIRST YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCES

(HOMA BAY CAMPUS)

NES 822: EARTH SYSTEMS SCIENCE

Date: 30th November, 2013, *Time: 9.00 - 12.00 noon*

INSTRUCTIONS:

- **Answer ANY FOUR questions.**
- **Each question is 15 marks.**

NES 822: EARTH SYSTEM SCIENCE

1. **Discuss Earth Systems science analysis of sphere – sphere of a forest fire (15 Marks)**
2. **Using the data below from the following table for approximate preindustrial concentration and 1985 concentration.**

Gas	1850	1985	Assumed growth rate (1985-2075)
Co2	280 Ppm	345 ppm	0.57%
CH4	1150 ppb	1790 ppb	1%
N2O	285 ppb	305 ppb	0.5%
CFC-11	0 ppb	24 ppb	2.5%
CFC - 12	0 ppb	0.40 ppb	2.5%

Using the assumed growth rates above.

a) **Calculate the combined equilibrium temperature change for 1985 (7Marks)**

b) **Calculate the equilibrium temperature increase in the year 2075. Assume T is 3° C (8 Marks)**

3. **Describe the A,C,D and E climate classification categories (15 Marks)**
4. **Calculate the tones of carbon in the atmosphere corresponding to a concentration of 360 ppm of CO2. Assume the total mass of air equals 5.1 x 10 Kg. The density of air standard temperature and pressure (STP,O° C, and 1 atm) is 1.29 Kglm³ (15 Marks)**
5. **Diagram Earth's interior cross section and describe each distinct layer.(15 Marks)**
6. **a) Using a simple radiation balance model that includes earth' s albedo prove that the effective temperature of the Earth is 255 k. (10 Marks)**
   b)The actual global temperature is 288 k and not 255 k account for the difference (5 Marks)