

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF PHYSICAL SCIENCES
DEPARTMENT OF GEOGRAPHY

FIRST SEMESTER 2015/2016 SESSION UNDERGRADUATE EXAMINATION

COURSE CODE: MET 511

COURSE TITLE: ADVANCED TOPICS IN PHYSICAL METEOROLOGY

INSTRUCTION: Answer question ONE and any other three. The use of relevant illustrations, specific examples and appropriate diagram will be rewarded.

TIME ALLOWED: 2Hours

Question 1:

Given that 120 units of solar energy were received on top of the atmosphere on a hot summer day and that the atmosphere reflects 20 percent and absorbs 20 percent.

- a) Find the amount of solar energy transmitted to the surface.
- b) What is the surface reflectivity when 60 percent of the incident solar energy is absorbed and the surface transmissivity is zero percent? How many units of energy are reflected by:
 - i) The surface
 - ii) The atmosphere, and
 - iii) The earth-atmosphere system?
- c) What is the reflectivity of the earth-atmosphere system?

Question 2:

Explain in detail, the important functional roles of the following GHGs in the atmosphere:

- a. Water vapour
- b. Carbon dioxides (CO_2)
- c. Ozone

Question 3:

Explain in detail, the concept of solar radiation and the energy budget in relation to the earth-atmosphere system.

Question 4:

High levels of tropospheric ozone are "bad", we try to reduce them whereas high levels of stratospheric ozone are "good", we try to maintain them. Explain this paradox.

Question 5:

Write explanatory note on the following.

- I. Greenhouse Effect
- II. Blackbody
- III. Reflectivity

Question 6:

Discuss the usefulness of satellite application in weather observation and prediction (Meteorology)