

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND SCIENCE EDUCATION
DEPARTMENT OF GEOGRAPHY

SECOND SEMESTER 2010/2011 SESSION UNDERGRADUATE EXAMINATION

COURSE CODE: MET 322 (2 Units)

COURSE TITLE: THERMODYNAMICS AND PRECIPITATION PROCESS

INSTRUCTIONS: Answer Question 1 and any other 3 questions

TIME ALLOWED: 2½ Hours

1. Distinguish briefly between the following pairs of processes:
 - i. Conduction and convection
 - ii. Pressure and force
 - iii. Thermodynamics and statics
 - iv. Orographic and frontal lifting
 - v. Precipitation and rainfall
 - vi. Raindrops and cloud droplets
 - vii. Dry and wet adiabatic lapse rates
 - viii. Kinetic energy and momentum
 - ix. Long wave and short wave radiation
 - x. Stability and instability of air parcel
2.
 - a) Define the first and second laws of thermodynamics
 - b) Explain the following equation and their relevance to stability or instability of air parcel
$$dE = dq + dw$$
$$dE = dw$$
$$dE = dQ$$
 - c) What is the concept of internal energy of a gas?
3.
 - a. Describe the four mechanisms that lift air and promote cloud formation.
 - b. what determines the terminal velocity of falling rain drops?
 - c. How do the growth processes of rain droplets in warm and cold clouds differ from each other?
4.
 - a. Explain the Bergeron process of precipitation.