FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF SCIENCE AND SCIENCE EDUCATION

DEPARTMENT OF GEOGRAPHY

SECOND SEMESTER 2009/2010 SESSION UNDERGRADUATE EXAMINATION

COURSE CODE: MET 320

COURSE TITTLE: **General Circulation of the Atmosphere 11**

INSTRUCTION: ANSWER ANY FOUR QUESTIONS.

TIME ALLOWED: 2½ Hours

1a Define Kinematic in relation to atmosphere

B. Briefly explain the relationship between kinematic and atmospheric processes

C. Outline and explain the parameters required in describing motion in a straight line.

2a. State the four equations of motion

B. Use the equations stated in (1) above to solve the following problems

i. A car moves from rest with an acceleration of $0.2m/s^2$. Find its velocity when it is moved a distance of 50m.

ii. A train slows from 108km/hr with a uniform retardation of $5m/s^2$. How long will it take to reach 18km/hr, and what is the distance covered?

3. Access the contribution of internal friction which exist between layers of a liquid or gas in motion to the general circulation of the atmosphere.

4. Discuss the two possible ways by which the atmosphere can transport heat and momentum.

5. (a) Discuss the relevance of the equation of state in the study of atmospheric thermodynamics.

(b) Using the basic laws of thermodynamics, derive an expression for the potential temperature of air in terms of its pressure P, temperature T and standard pressure P0. What is the name given to the equation.

6. (a) When is the atmosphere said to be in a hydrostatic equilibrium?

(b) Derive the hydrostatic equation

(C) Suppose at the surface a 1000m thick layer of air (under standard conditions) has an average density of 1.1kgm-3 and an acceleration of gravity 9.8ms-2. Use the hydrostatic equation to compute the difference in pressure.