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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

 **2018\_2 SEMESTER EXAMINATION**

**COURSE CODE: PHY 455**

**COURSE TITLE: LOWER ATMOSPHERIC PHYSICS**

**CREDIT UNIT 3**

**TIME ALLOWED (2½ HRS)**

**INSTRUCTION: *Answer question 1 and any other four questions***

**QUESTION 1**

a. What is solar wind? **3 marks**

b. Discuss the four layers of the earth’s atmosphere **10 marks**

c. Explain space weather and its impact on human activity **6 marks**

d. State the second law of thermodynamics **3 marks**

**QUESTION 2**

 a. Define adiabatic process. **3 marks**

 b. Derive the equation of a reversible adiabatic process. **5 marks**

c. Explain Electromagnetic coupling. **4 marks**

**QUESTION 3**

 a. Doppler line broadening arises as a result of the motion of the individual atom in a hot gas.

 Explain **5 marks**

 b. Distinguish between moisture and quality of the liquid-vapour saturation region. **2 marks**

 c. Using the P-T diagram, discuss the saturation regions for phases of pure water **5 marks**

**QUESTION 4**

a. Define the following: (i) Intensity **3 marks**

 (ii) Flux **3 marks**

b. Show that radiactive transfer equation is giving as m = cos q **6 marks**

**QUESTION 5**

a. Derive an equation that shows that pressure decreases with height. **5 marks**

b. Briefly explain the following, quoting formulas where necessary (i) mixing ratio

 (ii) relative humidity (iii) partial pressure of vapour. **5 marks**

c. Discuss the effect of troposphere on radio wave propagation. **2 marks**

**QUESTION 6**

 a. Explain occurrence of aurora in the thermosphere **4 marks**

b. Given that the pressure is 150kpa and that the quality is 1%, determine:

1. the specific volume ,v **2 marks**
2. the enthalpy h **3 marks**
3. the entropy s of water. **3 marks**