NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCE

2021_2 EXAMINATIONS

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

1. Write shot note on the following terms;

(i) Astronomy **(3 marks)** (ii) Galaxy **(3 marks)** (iii) Aurora **(3 marks)**

(iv) Redshift **(3 marks)** (v) Steady State Universe **(2.5 marks)** (vi) Transition **(2.5 marks)**

(vii) Thermodynamics **(2.5 marks)** (viii) Stellar Magnitude **(2.5 marks)**

QUESTION 2

a. Discus briefly the term Atmosphere of the Earth **(4 Marks)**

b. Enumerate and discus any three (3) properties of atmosphere **(6 Marks)**

c. Mention the region of the Atmosphere is capable of reflecting radio waves, **(2 Marks)**

QUESTION 3

a. Mention three (3) major constituents of Earth's atmosphere in terms of Volume and percentage **(3 Marks)**

b. Briefly discuss atmospheric stratification from highest to lowest **9 Marks)**

QUESTION 4

a. State the following law:

(i) Kirchhoff law (ii) Stefan-Boltzmann law (iii) Wien's Displacement Law **(6 Marks)**

b. The Sun converts 6×10^{11}kg of hydrogen into helium every second. Only 99.3% (= 0.993) of that goes into helium; the rest, 00.7%, goes into the energy that causes the Sun to shine. So, over the next 5 billion years (= 1.6×10^{17}seconds). Calculate the amount of hydrogen that will be converted into helium. **(4 Marks)**

c. State the Keplers' second Law **(2 Marks)**

QUESTION 5

a. State the First law of Thermodynamics **(2 Marks)**

b. Discus the any three (3) applications of First law of Thermodynamics **(6 Marks)**

c. Suppose there is heat transfer of 40.00 J to a system, while the system does 10.00 J of work. Later, there is heat transfer of 25.00 J out of the system while 4.00 J of work is done on the system. What is the net change in internal energy of the system? **(4 Marks)**

QUESTION 6

a. Explain the following with relevant derivation;

(i) The internal energy of a system held at constant volume; **(4 Marks)**

(ii)The reversible isobaric processes the enthalpy of a system **(4 Marks)**

b. Hydrogen peroxide decomposes according to the following thermo chemical reaction:

$$H_2O_2\,(l) \rightarrow H_2O(l) + 1/2\ O_2(g);\ \Delta H = -98.2\ kJ$$

Calculate the change in enthalpy, ΔH, when 1.00 g of hydrogen peroxide decomposes. **(4 Marks)**