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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

2021_1 EXAMINATIONS

COURSE CODE: **PHY457**

COURSE TITLE: **ENVIRONMENTAL PHYSICS**
CREDIT UNIT: **3**
TIME ALLOWED: **(2½ HRS)**

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

QUESTION 1

a.(i) What is air pollution? **3 Marks**
(ii) Write short note on hydroelectric power plant. **3 Marks**
b.(i) The Hubble Space Telescope (HST) is a satellite orbiting at a height of 596km above the surface of the earth. What will be the orbital speed of HST if it remains in a circular orbit? **3 Marks**
(ii) List the six (6) orbit of the solar system. **6 Marks**
c.(i) Briefly describe many-body problem. **2 Marks**
(ii) List the five distinct components of the earth. **5 Marks**

QUESTION 2

a. List five (5) environmental problems facing mankind. **5 Marks**
b. Write short note on thermal pollution. **4 Marks**
c. Write the equation for the efficiency η of the heat engine and state the meaning of each symbol. **3 Marks**

QUESTION 3

a. Briefly discuss Nuclear energy **3 Marks**
b. Differentiate between tidal power plants and wind power plants. **4 Marks**
c. Mention the properties of the atmosphere. **5 Marks**

QUESTION 4

a. Write briefly on vertical diminution of density with height and state the hydrostatic equation. **4 Marks**
b. Assuming that $p_0 = 1.01\text{x}10^5 \text{N/m}^2$, $\rho_0 = 1.23\text{kg/m}^3$, $\Upsilon = 1.4$ and $g = 9.80\text{m/s}^2$, estimate the limit of the adiabatic atmosphere. **5 Marks**
c. Write the temperature gradient (or the lapse rate) of an adiabatic atmosphere. **3 Marks**

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QUESTION 5

a. Write short note on ozone layer depletion. **4 Marks**

b. Cost-benefit analysis is built on the two (2) essential theoretical foundations. State them. **4 Marks**

c. State the two (2) aggregation rules used to carry out an effective cost-benefit analysis. **4 Marks**

QUESTION 6

a. Copy and complete the following table:

The atmosphere	
	Is the liquid water component of the earth.
The cryosphere	
	Is the solid component of the earth.
	Is made up of three parts: animals, plants and decaying organic matter.

5 Marks

b. Give three types of weathering. **3 Marks**

c. Briefly, explain the adiabatic atmosphere. **4 Marks**