NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91 Cadastral Zone, NnamdiAzikwe Express Way, Jabi, Abuja
FACULTY OF EDUCATION
APRIL / MAY, 2019_1 EXAMINATION

COURSE CODE: SED328
COURSE TITLE: ENERGY AND MATTER II
CREDIT UNITS: 2
INSTRUCTIONS: ANSWER QUESTION 1 AND ANY OTHER TWO QUESTIONS.
TIME ALLOWED: 2 HOURS.

QUESTION ONE:

The nucleus of a heavy element is represented by a symbol $^{235}_{92}\mathbf{U}$**:**

i. What is the atomic number of the element? (1mark)
ii. What is the mass number of the element? (1mark)
iii. How many neutrons has the element? (1mark)
iv. How many protons has the element? (1mark)
v. How many electrons has the element? (1mark)
vi. Using sign notations **only**, differentiate between neutrons and electrons.(3marks)
vii. When the nucleus of the heavy element above, is bombarded with neutrons, the following equation results: $^{1}_{0}\mathbf{n} + ^{235}_{92}\mathrm{U} \rightarrow {}^{141}_{56}\mathbf{Ba} + {}^{92}_{36}\mathbf{Kr} + 3{}^{1}_{0}\mathbf{n} + \mathbf{Energy}$. This is called-- ? (1mark)
viii. Define the concept in serial number vii, above.(3 marks)
ix. Name the elements: **U**, **Ba** and **Kr**. (6 marks)
x. The symbol: $^{1}_{0}\mathbf{n}$**,** in the above equation, represents--?(2marks)
xi. Account for the difference between the total mass of the component products in equation vi, above and the heavy element? (3 marks)
xii. What happens when two or more light nuclei fuse together to form a heavier nucleus? (2 marks)
xiii. Using hydrogen nuclei as an example, write an equation to illustrate the reaction in serial number ix, above. (5 marks)

(**Total score = 30 marks, 50 minutes)**

QUESTION TWO

2a. With appropriate chemical equations, discuss the formation of acid rain. (7 marks)

b. What is Ozone? Outline four health effects of ground level ozone. (5 Marks)

c i. With a balanced chemical equation **only**, illustrate the importance of sunlight in the process by which green plants manufacture their food.(6 marks)

ii. State the name of the process.(2 marks)

(Total score =20 marks, 35 minutes)

QUESTION THREE

3a.i.Explain the concept of Global warming, mentioning any three greenhouse gases. (4 Marks)

(ii) Outline any five measures that can be taken to control Global warming (5marks)

b. Discuss any three ways thermal energy can be generated. (6 Marks)

c. (i) State the full meaning of each of the four thermodynamic concepts represented by symbols in this equation: $\Delta G = \Delta H - T\Delta S$ (5 Marks)

(Total score =20 marks, 35minutes)

QUESTION FOUR:

4(a) Visualize a hypothetical situation in which soup in a pot 'A' is being cooked on a stove 'B'. The handle of the pot is labelled as 'C'.

Figure 1 above represents a pot of soup (A) being cooked on a Stove (B), while, C represents the handle of the pot. Briefly describe the mode/process of heat transfer at points A, B and C. (2 x 3 =6marks)

b. Discuss **one merit** and **a demerit** of using fire wood as a major source of energy in developing countries for cooking.(4 marks).

Ci .Outline two ways by which thermal energy can be generated (4 marks).

ii. Mention any six ways thermal energy is useful to man (6 marks).

(Total score = 20marks, 35minutes).