WORKSHEET 2

CHAPTER 12 – RADIOACTIVITY AND NUCLEAR ENERGY

A. Tick (✓) the correct option.

1. The diameter of an atom is
   a. 10^{-15} m. b. 10^{-10} m. c. 10^{-5} m. d. none of these.
2. The energy released in nuclear reactions is expressed in units of
   a. joule. b. watt. c. electron volt. d. dioptre.
3. The mass number and atomic number remains unchanged in
   a. α-decay. b. β-decay. c. γ-decay. d. none of these.
4. $^{23}_{11}Na$ and $^{24}_{12}Mg$ are examples of
   a. isobars. b. isotopes. c. isotones. d. none of these.
5. The number of neutrons in an hydrogen atom is
   a. zero. b. two. c. ten. d. one.

B. Fill in the blanks.

1. The atoms of different elements having different mass numbers and atomic numbers are called _____
2. $^{12}_{6}C$, $^{13}_{6}C$ and $^{14}_{6}C$ are all examples of _____
3. The phenomenon of emission of an electron from a radioactive element is called _____
4. Radioactive isotopes are used as fuel for generating _____ in atomic power stations.
5. The ionizing power of _____ is very high.

C. State whether the following statements are true or false.

1. $^{1}_{1}H$, $^{2}_{1}H$ and $^{3}_{1}H$ are three isotones of hydrogen.
2. The protons and neutrons in the nucleus together are called nucleons.
3. The outermost shell of an atom cannot accommodate more than 16 electrons.
4. The absolute charge of a proton is equal to 1.602×10^{-19} C.
5. 1 MeV is equal to 1.602×10^{-13} J.

D. Match the following.

1. Deuterium	no charge
2. α-particle	isotones
3. γ-radiation	fuel for nuclear fusion
4. $^{23}_{11}Na$ and $^{24}_{12}Mg$	negatively charged
5. β-particle	positively charged

Name: ..... Teacher's signature: .....

Class: ..... X ..... Date: .....

E. Answer the following questions.

Very short answer questions

1. What is the electronic configuration of sodium?
2. What is the atomic number of chlorine?

Short answer questions

1. Give one example of isobars.
2. Complete the following nuclear changes

$$^{A}_{Z}X \xrightarrow{\alpha\text{-decay}} X_1 \xrightarrow{\alpha\text{-decay}} X_2$$

Long answer questions

1. Differentiate between nuclear fission and nuclear fusion.
2. What are the uses of radioactive isotopes in industries?

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. b 2. c 3. c 4. c 5. d

B. Fill in the blanks.

1. isotones 2. isotopes 3. β-decay 4. electricity 5. α-particle

C. State whether the following statements are true or false.

1. F 2. T 3. F 4. T 5. T

D. Match the following.

1. Deuterium	fuel for nuclear fusion
2. α-particle	positively charged
3. γ-radiation	no charge
4. $^{23}_{11}Na$ and $^{24}_{12}Mg$	isotones
5. β-particle	negatively charged

E. Answer the following questions.

Very short answer questions

1. Sodium

K	*L*	*M*	*N*
2	8	1	—

2. 17

Short answer questions

1. $^{23}_{11}Na$ and $^{23}_{12}Mg$
2. $^{A}_{Z}X \xrightarrow{\alpha\text{-decay}} {}^{A-4}_{Z-2}X \xrightarrow{\alpha\text{-decay}} {}^{A-8}_{Z-4}X$

Long answer questions

1. Refer Table 12.5, Page 263 to the textbook.
2. The uses in industries are as follows:
   i. Radioactive isotopes are used as fuel for generating electricity in the atomic power stations.
   ii. Radioactive isotopes are used to investigate the wear and tear in complex machines.
   iii. The thickness of plastics, paper and metal sheets are controlled automatically during manufacturing process by use of β-particles.
   iv. The radiation from isotopes are used for dispersing unwanted static, electricity in the air and to ionize the air in the smoke detectors.