

# WORKSHEET 2

## CHAPTER 12 – RADIOACTIVITY AND NUCLEAR ENERGY

### A. Tick (✓) the correct option.

- The diameter of an atom is
  - $10^{-15}$  m.
  - $10^{-10}$  m.
  - $10^{-5}$  m.
  - none of these.
- The energy released in nuclear reactions is expressed in units of
  - joule.
  - watt.
  - electron volt.
  - diopetre.
- The mass number and atomic number remains unchanged in
  - $\alpha$ -decay.
  - $\beta$ -decay.
  - $\gamma$ -decay.
  - none of these.
- ${}_{11}^{23}\text{Na}$  and  ${}_{12}^{24}\text{Mg}$  are examples of
  - isobars.
  - isotopes.
  - isotones.
  - none of these.
- The number of neutrons in an hydrogen atom is
  - zero.
  - two.
  - ten.
  - one.

### B. Fill in the blanks.

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

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

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

### D. Match the following.

- |  |                         |
|--|-------------------------|
| 1. Deuterium   | no charge               |
| 2. $\alpha$ -particle                                  | isotones                |
| 3. $\gamma$ -radiation                                 | fuel for nuclear fusion |
| 4. ${}_{11}^{23}\text{Na}$ and ${}_{12}^{24}\text{Mg}$ | negatively charged      |
| 5. $\beta$ -particle                                   | positively charged      |

Name: .....

Teacher's signature: .....

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

Date: .....

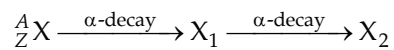
**E. Answer the following questions.**

**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



**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.  $\beta$ -decay                              4. electricity                              5.  $\alpha$ -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. $\alpha$ -particle                                  | positively charged      |
| 3. $\gamma$ -radiation                                 | no charge               |
| 4. ${}_{11}^{23}\text{Na}$ and ${}_{12}^{24}\text{Mg}$ | isotones                |
| 5. $\beta$ -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.  ${}_{11}^{23}\text{Na}$  and  ${}_{12}^{23}\text{Mg}$

2.  ${}^A_Z\text{X} \xrightarrow{\alpha\text{-decay}} {}^{A-4}_{Z-2}\text{X} \xrightarrow{\alpha\text{-decay}} {}^{A-8}_{Z-4}\text{X}$

#### Long answer questions

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