CHAPTER-13
Nuclei
ASSIGNMENT-2

MCQ

Q1. Binding energy per nucleon of a stable nucleus is

(a) 8 eV (b) 8 KeV (c) 8 MeV (d) 8 BeV

Q2. The binding energy per nucleon is almost constant for many nuclei. It shows that nuclear forces are

(a) Charge independent

(b) Saturated in nature

(c) Short range in nature

(d) Attractive in nature

Q3. The electrons cannot exist inside the nucleus because

(a) de-Broglie wavelength associated with electron in β -decay is much less than the size of nucleus

(b) de-Broglie wavelength associated with electron in β -decay is much greater than the size of nucleus

(c) de-Broglie wavelength associated with electron in β -decay is equal to the size of nucleus

(d) Negative charge cannot exist in the nucleus

Q4. Which one of the following has the identical property for isotopes?

(a) Physical property (b) Chemical property (c)Nuclear property (d) Thermal property

Q5. When the number of nucleons in nuclei increases, the Binding energy per nucleon

(a) Increases continuously with mass number

(b) Decreases continuously with mass number

(c) Remains constant with mass number

(d) First increases and then decreases with increase of mass number

Q6. Fusion reactions take place at high temperature because

(a) Atoms are ionised at high temperature

(b) Molecules break up at high temperature

(c) Nuclei break up at high temperature

(d) Kinetic energy is high enough to overcome repulsion

Q7. The tritium which is the isotope of hydrogen contains

(a)One proton, one neutrons

(b) One proton, two neutrons

(c) Two protons, one neutrons

(d)None

Q8. Heavy stable nuclei have more neutrons than protons. This is because of the fact that

(a)Neutrons are heavier than protons.

(b) Electrostatic force between protons is repulsive.

(c) Neutrons decay into protons through beta decay.

(d) Nuclear forces between neutrons are weaker than that between protons

ASSERTION AND REASON QUESTIONS

Read the assertion and reason carefully to mark the correct option out of the options given below:

(a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(c) If assertion is true but reason is false.

(d) If the assertion and reason both are false.

(e) If assertion is false but reason is true

Q9. Assertion : Fragments produced in the fission of 235 U are radioactive.

Reason : The fragments have abnormally high proton to neutron ratio.

Q10. Assertion : All the radioactive elements are ultimately converted in lead.

Reason : All the elements above lead are unstable.

Q11. Assertion : It is not possible to use Cl 35 as the fuel for fusion energy.

Reason : The binding energy of Cl 35 is too small.

Q12. Assertion : Electron capture occurs more often than positron emission in heavy elements.

Reason : Heavy elements exhibit radioactivity.

(2 MARKS QUESTIONS)

Q13. For a given nuclear reaction the B.E./nucleon of the product nucleus/nuclei is more than that for the original nucleus/nuclei. Is this nuclear reaction exothermic or endothermic in nature? Justify your choice

Q14. Calculate the energy equivalent of 1amu in MeV.

(3 MARKS QUESTIONS)

Q15.A given coin has a mass of 3.0 g . Calculate the nuclear energy that would be required to separate all the neutrons and protons from each other. For simplicity assume that the coin is entirely made of 63 29Cu atoms (of mass 62.92960 u)

Q16. Calculate binding energy per nucleon of $^{209}Bi_{83}$ nucleus. Given that mass of $^{209}Bi_{83}$ = 55.934939u, mass of proton = 1.007825u, mass of neutron = 1.0086 MeV665 u and 1 u = 931 MeV.

Q17. Suppose, we think of fission of a $^{56}Fe_{26}$ nucleus into two equal fragments, $^{28}Al_{13}$. Is the fission energetically possible? Mass of $^{56}Fe_{26}$ = 55.934939u, mass of $^{28}Al_{13}$ = 55.934939u

1) How is the size of a nucleus experimentally determined? Write the relation between the radius and mass number of the nucleus is independent of its mass number