

# PRACTICE PAPER 13 (2024-25)

## CHAPTER 13 NUCLEI (ANSWERS)

**SUBJECT: PHYSICS**

**CLASS : XII**

**MAX. MARKS : 40**

**DURATION : 1½ hrs**

**General Instructions:**

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 4 questions of 2 marks each. Section C comprises of 3 questions of 3 marks each. Section D comprises of 1 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.

### SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The curve of binding energy per nucleon as a function of atomic mass number has a sharp peak for helium nucleus. This implies that helium nucleus is:
- (a) radioactive
  - (b) unstable
  - (c) easily fissionable
  - (d) more stable nucleus than its neighbours.

Ans. (d) more stable nucleus than its neighbours.

The curve of binding energy per nucleon as a function of atomic mass number shows the average amount of energy needed to remove one nucleon from a nucleus. This curve has a sharp peak for the helium nucleus, which implies that the helium nucleus has the highest binding energy per nucleon among all the nuclei. This means that the helium nucleus is more stable than its neighbouring nuclei.

2. Which of the following statement about nuclear forces is NOT true?
- (a) The nuclear force between two nucleons falls rapidly to zero as their distance is more than a few femtometres.
  - (b) The nuclear force is much weaker than the Coulomb force.
  - (c) The force is attractive for distances larger than 0.8 fm and repulsive if they are separated by distances less than 0.8 fm.
  - (d) The nuclear force between neutron-neutron, proton-neutron and proton-proton is approximately the same.

Ans. (b) The nuclear force is much weaker than the Coulomb force.

As we know that nuclear forces are strongest in magnitude. But they are short range forces because the distance between the nucleons is 0.7 fermi which is very small. They are charge independent, so they result for interaction of every, nucleon with the nearest limited number of nucleons.

3. When two nuclei ( $A \leq 10$ ) fuse together to form a heavier nucleus, the:
- (a) binding energy per nucleon increases.
  - (b) binding energy per nucleon decreases.
  - (c) binding energy per nucleon does not change.
  - (d) total binding energy decreases.

Ans. (a) binding energy per nucleon increases.

When two or more lighter nuclei fuse, they release a large amount of energy, that indicates the increase in the binding energy per nucleon.

4. Fusion reaction takes place at high temperature because:

# Atomic Nuclei Section 1 Answers

**N Noddings**



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