

1.A nucleus emits an α -particle, followed by two β -particles. The final nucleus will be

- an isotone of the original one.
- an isotope of the original one.
- an isobar of the original one.
- none of these

2.The radius R of a nucleus is given by

- $R = r_0 A^{-1/3}$
- $R = r_0 A^{1/3}$
- $R = r_0 A^3$
- None of these

3.1 barn is an unit of area having the magnitude of

- 10^{24} cm^2
- 10^{-28} cm^2
- 10^{-24} m^2
- None of these.

4.A nucleus with $A=235$ splits into two nuclei of mass numbers in the ratio 1 : 2.The ratio of the radii of the new nuclei are

- 1 : 2
- 1 : 1.26
- 8 : 1
- None

5.Nuclear force is

- Spin independent
- Both charge and spin independent
- Spin dependent but charge independent
- Charge dependent

6. Which one of the following statements is correct?

- The mass of the nucleus must be less than the sum of the masses of the constituent neutrons and protons.
- The mass of the nucleus must be equal to the sum of the masses of the constituent neutrons and protons
- The mass of the nucleus must be greater than the sum of the masses of the constituent neutrons and protons.
- The mass of the nucleus must be equal to only the masses of the constituent neutrons .

7. The order of magnitude of the binding energy per nucleon in a nucleus is

- 10^{-3} MeV
- 10 MeV
- 10^{-3} MV
- 0.1 MeV

8. If the nuclear radius of ^{27}Al is 3.6 Fermi, the approximate nuclear radius of ^{64}Cu in Fermi is

- 3.6 fm
- 4.8 fm
- 1.2 fm
- 2.4 fm

9. The nucleus which is an isotope of Cl-37 and also an isobar of Ar-18 has mass number A and atomic number Z given by

- A=35, Z=18
- A = 37, Z = 17
- A = 39, Z = 17
- A = 37, Z = 19

10. Which of the following statements with reference to nuclear forces is not true?

- Short range
- Charge independent
- Strongest force
- Spin independent

11. The mean momentum of a nucleon in a nucleus with mass number A varies

- A
- $A^{-1/3}$
- $A^{-2/3}$
- A^2

12. The asymmetry term in semi-empirical mass formula is due to

- non-spherical shape of the nucleus
- non-zero spin of the nucleus
- unequal number of protons and neutrons on the nucleus
- odd number of protons inside the nucleus

13. According to the shell model of the nucleus

- magic number exist
- nucleons interact with their nearest neighbours only
- nucleons in a nucleus interact with a general force field
- large electronic quadrupole moment exists for certain nuclei

14. Which one of the following nuclei is 'doubly magic'?

- ${}_{50}^{120}\text{Sn}$
- ${}_{82}^{208}\text{Pb}$
- ${}_{38}^{88}\text{Sr}$
- none

15. Which one of the following nuclei is a closed shell nucleus?

- ${}_{8}^{16}\text{O}$
- ${}_{20}^{40}\text{Ca}$
- ${}_{20}^{48}\text{Ca}$
- All the three

16. The N –values of four nuclei are given below. Which one has the lowest neutron absorption cross-section?

- 50
- 143
- 146
- 12

17. The volume of a nucleus in an atom is proportional to the

- Mass number
- Proton number
- Neutron number
- Electron number

18. The size of nucleus is estimated to be of the order of

- few picometer (10^{-12} m)
- few femtometer (10^{-15} m)
- few nanometer (10^{-9} m)
- few micrometer (10^{-6} m)

19. Which one of the following statement is correct?

- The density of the nuclear matter is proportional to mass number A .
- The density of the nuclear matter is proportional to mass number A^2 .
- The density of the nuclear matter is independent of mass number A .
- The density of the nuclear matter is proportional to mass number $A^{1/3}$.

20. The Surface-energy term appears in semi-empirical mass formula as a result of

- repulsion between the charged particles, protons, in the nucleus
- reduction of total binding energy due to nucleons on the surface of the nucleus
- excess number of neutrons in the nucleus
- intrinsic nucleonic spin