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The Atomic Nucleus Chapter 19 MCQs

1. Charge on an electron is:

- $+ 1.6021 \times 10^{-19}$ C.
- $- 1.6021 \times 10^{-19}$ C.
- $- 1.6021 \times 10^{-20}$ C.
- $+ 1.6021 \times 10^{-20}$ C.

2. Rest mass of electron is:

- 9.1×10^{-31} g.
- 9.1×10^{-31} kg.
- 1.67×10^{-27} kg.
- 1.67×10^{-27} g.

3. Rutherford bombarded thin gold foil and observed their scattering. His experiments proved the existence of.

- Electrons revolving around the nucleus.
- Protons in the nucleus.
- Neutrons in the nucleus.
- A high density positively charged nucleus.

4. If "Z" is the atomic number (or number of protons) and "A" is its atomic weight then the number of nucleons in the nucleus will be:

- $N = A + Z$.
- $N = A - Z$.
- $N = A \times Z$.
- $N = Z - A$.

5. The total number of protons present in a nucleus is called:

- Mass number.
- Atomic weight.

Atomic number of charge number

6. 1 atomic mass unit (amu) is equal to:

- 1.66×10^{-31} kg.
- 1.66×10^{-31} g.
- 1.66×10^{-27} kg.

7. Atoms of the same element (equal atomic number Z) but of different mass number are called:

- Isotopes.
- Isobars.
- Isomers.
- Allotropes.

8. In ${}_1\text{H}^3$ (an isotope of hydrogen) there are:

- 2 neutrons.
- 3 neutrons.
- 4 neutrons.

9. The process of spontaneous emission of α , β and γ -rays from the nucleus of heavy elements is called:

- Photoelectric effect.
- Compton Effect.
- Fission reaction.
- Radioactivity.

10. α , β and γ -rays can penetrate matter, the distance through which they penetrate is a measure of their penetrating power. The highest penetrating power is of:

- α Particles.
- β Particles.
- γ -rays.

11. While passing through matter, α , β and γ -rays ionize its atoms. Which one is most ionizing (i.e. produces more ions than the others):

- α Particles.
- β Particles.
- γ -rays.

12. A radioactive nucleus ${}_zX^A$ emits a α particle, the nucleus left behind called daughter nucleus. Daughter nucleus will be:

- ${}_{z-2}Y^{A-2}$.
- ${}_{z-2}Y^{A-4}$.
- ${}_{z+2}Y^{A-4}$.
- ${}_{z+2}Y^{A-6}$.

13. A radioactive nucleus ${}_zX^A$ emits a β particle, the nucleus left behind is called daughter nucleus daughter nucleus will be:

- ${}_{z-1}Y^A$.
- ${}_{z+1}Y^A$.
- ${}_{z-1}Y^{A+1}$.
- ${}_{z+1}Y^{A+1}$.

14. Time in which half of the original radioactive nuclei decay is called:

- Decay constant.
- Half life.
- Half activity.
- Decay series.

15. Decay constant λ and half life $T_{1/2}$ of an element is related by:

- $\lambda + T_{1/2} = 0.693$.
- $\lambda T_{1/2} = 0.693$.
- $\lambda/T_{1/2} = 0.693$.
- $T_{1/2}/\lambda = 0.693$.

16. Gamma rays (γ -rays) are:

- Positively charged particles.
- Negatively charged particles.
- Neutral particles.
- High energy electromagnetic waves.

17. The nuclei having the same mass number but different atomic number are called: (8-a, 2001)

- Isotopes.
- Isobars.
- Isotones.
- Isomers.

18. In radioactive decay law, $N = N_0 e^{-\lambda t}$, λ represents: (7-a, 02, P.M)

- Wavelength.
- Half life.
- Mass of radioactive sample.
- Decay constant.

19. Wilson cloud chamber is used: (8-a, 2002, P.M)

- For the study of clouds.
- To produce X-rays.
- To take photograph of high velocity ions.
- To produce β -particles.

20. Breeder reactor is used to convert: (8-a, 2002, P.M)

- ${}_{92}\text{U}^{235}$ into ${}_{92}\text{U}^{236}$.
- ${}_{92}\text{U}^{238}$ into ${}_{92}\text{U}^{239}$.
- ${}_{92}\text{U}^{235}$ into ${}_{56}\text{Ba}^{144}$ and ${}_{36}\text{Kr}^{89}$.
- ${}_{92}\text{U}^{235}$ into ${}_{92}\text{U}^{237}$.

21. The process in which heavier nuclei is formed from the combination of lighter nuclei is called: (8-a, 02, P.M)

- Fission.
- Fusion.
- Radioactivity.
- Mass deficit.

22. Nuclear force is:

- Very strong.
- Short range.
- Attractive.
- Keeps the nucleons together.
- All of these.

23. Binding energy of a nucleus is:

- The amount of energy required to split a nucleus into its constituent nucleons.
- The energy released when nucleons of a given nucleus are fused together.
- According to Einstein's special theory of relativity, it is the energy which corresponds to mass defect of the nucleus.
- All of these.

24. Process of splitting a nucleus into lighter nuclei with the release of energy is called:

- Photoelectric effect.
- Radioactivity.
- Fission reaction.
- Fusion reaction.

25. In a nuclear reactor..... Reaction takes place.

- Photoelectric effect.
- Radioactivity.
- Fission reaction.
- Fusion reaction.

26. Any suitable material which can be used in a nuclear reactor to slow down fast neutrons is called:

- Coolant.
- Moderator.
- Energy absorber.
- Decelerator.

27. In an atom bomb.....reaction is allowed to proceed in an uncontrolled manner due to which huge amount of energy is released.

- Photoelectric effect.
- Radioactivity.
- Fission reaction.
- Fusion reaction.

28. The process of combining two or more light nuclei to form a heavier nucleus with the release of energy is called:

- Fission reaction.
- Fusion reaction.
- Photoelectric effect.
- Chain reaction.

29.reaction takes place in the sun and other stars, it is the source of their tremendous amount of energy:

- Fission reaction.
- Fusion reaction.
- Photoelectric effect.
- Radioactivity.

30. In fission and fusion reactions energy is released due to:

- The breaking of bonds.
- Combustion process.
- Some other chemical reaction.
- Conversion of matter into energy.

31. α -particles are:

- Positively charged particles.
- Negatively charged particles.
- Neutral particles.
- High energy electromagnetic waves.

32. γ -rays are:

- Positively charged particles.
- Negatively charged particles.
- Neutral particles.
- High energy electromagnetic waves.

33. β -particles are:

- Positively charged particles.
- Negatively charged particles.
- Neutral particles.
- High energy electromagnetic waves.

34. When an element emits a γ -ray photon its charge and mass number:

- Both increase by one unit.
- Both decrease by one unit.
- Charge number increases but mass number decrease each by one unit.
- There is no change in both.

35. Which of the following particles is the most suitable for inducing nuclear reaction?

- Electrons.
- Protons.
- Neutrons.
- α -particles.

36. The disintegration of a photon into electron and positron near a heavy nucleus is known as:

- Annihilation. (8a I 2004)
- β -decay.
- α -decay.
- Pair production.

37. The energy equivalent to the mass reduced in the formation of a nucleus is called: (7a ii 2005)

- Nuclear energy.
- Binding energy.
- Fusion energy.
- Potential energy.

38. The atomic number of an element is increased as a result of:

- α -radiation. (8a 11 2005)
- β -radiation.
- Pair production.
- Photoelectric effect

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ANSWERS

- (1) -1.6021×10^{-19} C.
- (2) 9.1×10^{-31} kg.
- (3) A high density positively charged nucleus.
- (4) $N = A - Z$.
- (5) Atomic number or charge number.
- (6) 1.66×10^{-27} kg.
- (7) Isotopes.
- (8) 2 neutrons.
- (9) Radioactivity.
- (10) Y-rays.
- (11) α Particles.
- (12) ${}_{z-2}Y^{A-2}$.
- (13) ${}_{z+1}Y^A$.
- (14) Half life.
- (15) $\lambda T_{1/2} = 0.693$.
- (16) High energy electromagnetic waves.
- (17) Isomers.
- (18) Decay constant.
- (19) To take photograph of high velocity ions.
- (20) ${}_{92}U^{238}$ into ${}_{92}Pu^{239}$.
- (21) Fusion.
- (22) All of these.
- (23) All of these.
- (24) Fission reaction.
- (25) Fission reaction.
- (26) Moderator.
- (27) Fission reaction.
- (28) Fusion reaction.
- (29) Fusion reaction.
- (30) Conversion of matter into energy.
- (31) Positively charged particles.
- (32) High energy electromagnetic waves.
- (33) Negatively charged particles.
- (34) Here is no change in both.
- (35) Neutrons.
- (36) Pair production.
- (37) Binding energy.
- (38) β -radiation.