

12. According to Rutherford's atom model the size of the nucleus is -----
 (a) 10-10 m (b) 10-14 m (c) 10-16 m (d) 10-12 m
13. Who concluded that atoms are electrically neutral? -----
 (a) Prout (b) Bohr (c) Thomson (d) Rutherford
14. The charge of electrons is -----
 (a) zero (b) positive (c) infinity (d) negative
15. J.J. Thomson attempted to give -----
 (a) an idea of an atom (b) an idea of a molecule
 (c) a structure of an atom (d) a structure of an element
16. The entire positive charge of the atom is concentrated in a small portion -----
 (a) in an atom called nucleus (b) at the centre of the atom called nucleus
 (c) at the centre of the atom called neutron (d) at the centre of the atom called proton
17. In Rutherford's alpha particle scattering experiment a source of alpha particles is placed in -----
 (a) a lead block (b) a carbon block
 (c) uranium block (d) golden block
18. Alpha particles are scattered by ----- in Rutherford's experiment
 (a) a lead foil (b) a silver foil
 (c) a gold foil (d) a helium foil
19. In Rutherford's atom model, nucleus is surrounded by -----
 (a) neutrons (b) protons (c) positrons (d) electrons
20. According to Rutherford's atom model, electrons revolve in -----
 (a) stationary orbits (b) radiating orbits
 (c) various circular orbits (d) various elliptical orbits
21. The centripetal force for the electrons is provided by -----
 (a) the electromagnetic force (b) the magnetic force
 (c) the electrostatic force of repulsion (d) the electrostatic force of attraction between the electrons and the nucleus.
22. According to Bohr's atom model, electrons -----
 (a) revolve in radiating orbits (b) revolve in non-radiating orbits
 (c) revolve in the emitting orbits (d) revolve in orbits
23. In stationary orbits the angular momentum of the electron is -----
 (a) $h/2\pi$ (b) zero
 (c) infinity (d) integral multiple of $h/2\pi$
24. When an electron jumps from an orbit of higher energy (E_2) to another orbit of lower energy (E_1) $E_2 - E_1$ -----
 (a) $\frac{h}{2\pi}$ (b) $h\nu$ (c) $\frac{h\nu}{2\pi}$ (d) $\frac{v}{2\pi}$

25. When electrons revolve in the permissible non radiating orbits, they possess? ---

 (a) Moment of molecule (b) Force
 (c) Angular momentum (d) Definite angular momentum
26. When an electron revolves in stationary orbits it -----
 (a) radiates energy (b) does not radiate energy
 (c) absorbs energy (d) emits energy
27. Bohr could apply his postulates only for simple atoms like -----
 (a) helium (b) carbon (c) oxygen (d) hydrogen
28. A liquid drop is spherical due to -----
 (a) viscosity (b) surface tension (c) force (d) its nature
29. According to liquid drop model, the nucleus is supposed to have sub-groups in the form of -----
 (a) alpha particles (b) beta particles
 (c) sub atomic particles (d) elementary particles
30. The splitting up of a liquid drop is similar to that of -----
 (a) nuclear fusion (b) nuclear fission
 (c) nuclear reaction (d) radioactivity
31. In liquids, ----- hold a liquid-drop together
 (a) physical forces (b) electrostatic forces
 (c) interatomic forces (d) intermolecular forces
32. The atomic nucleus was discovered by -----
 (a) Bohr (b) Thomson (c) Rutherford (d) Prout
33. The nucleons refer to -----
 (a) protons (b) neutrons (c) positrons (d) protons and neutrons
34. The nucleus contains -----
 (a) protons (b) protons and electrons (c) neutrons and electrons
 (d) neutrons and protons
35. Mass of a proton is -----
 (a) 1.57×10^{-27} kg (b) 2.67×10^{-27} kg
 (c) 1.67×10^{-27} kg (d) 3.67×10^{-37} kg
36. Charge of a proton is -----
 (a) 1.602×10^{-19} C (b) 1.602×10^{19} C
 (c) 2.602×10^{-19} C (d) 1.67×10^{-19} C
37. The mass of a proton is -----
 (a) 1846.1 times the mass of an electron
 (b) 1836.1 times the mass of an electron
 (c) 1936.1 times the mass of an electron
 (d) 1836.1 times the mass of an atom

38. Which of the following is slightly heavier than a proton? -----
 (a) Electron (b) Neutron (c) Positron (d) Helium atom
39. The total number of nucleons in the nucleus of an atom is called -----
 (a) the atomic number of the atom (b) the mass number of the atom
 (c) the neutron number of the atom (d) the nucleon number of the atom
40. Atomic number of an atom gives the total number of -----
 (a) nucleons (b) neutrons (c) protons (d) positrons
41. For an atom having atomic number Z and mass number A; number of neutrons is given by $N =$ -----
 (a) $Z - A$ (b) $A - Z$ (c) $A + Z$ (d) $A - 2Z$
42. All nuclei are -----
 (a) having zero charge (b) having finite charge
 (c) negatively charged (d) positively charged
43. The magnitude of the positive charge of the nucleus is in a -----
 (a) greater than charge of an electron
 (b) less than charge of an electron
 (c) integral multiple of the charge of an electron
 (d) equal to charge of an electron
44. The density of atomic nucleus is -----
 (a) high (b) very high (c) low (d) very low
45. The very high value of the density of the nucleus show that nuclear matter is in a
 (a) compressed state (b) less compressed state
 (c) highly compressed state (d) highly expanded state
46. The shape of the nucleus is -----
 (a) a cube (b) circle (c) cylinder (d) spherical
47. The nuclear volume is found to be -----
 (a) inversely proportional to mass number
 (b) directly proportional to mass number
 (c) directly proportional to atomic number
 (d) inversely proportional to atomic number
48. The empirical formula for nuclear radius, the value of r_0 is -----
 (a) 2.3×10^{-15} m (b) 1.3×10^{15} m
 (c) 1.3×10^{-15} m (d) 3.3×10^{-15} m
49. In a nuclear reaction, the nucleus of the element is bombarded by -----
 (a) a proton (b) an electron (c) a neutron (d) a positron
50. $1 \text{ e v} =$ ----- J
 (a) 1.602×10^{19} (b) 1.602×10^{-19}
 (c) 2.602×10^{-20} (d) 3.602×10^{29}
51. $1 \text{ MeV} =$ ----- ev.
 (a) 10^8 (b) 10^{-6} (c) 10^6 (d) 10^{16}

52. In a nuclear reaction, ${}_{17}\text{Cl}^{35} + {}_0\text{n}^1 \rightarrow \text{x} + {}_2\text{He}^4 + 0.935 \text{ MeV}$ x refers to -----
 (a) ${}_{14}\text{P}^{31}$ (b) ${}_{14}\text{P}^{32}$ (c) ${}_{15}\text{P}^{30}$ (d) ${}_{15}\text{P}^{32}$
53. The energy released in the transmutation of chlorine into phosphorous is -----
 (a) 16 MeV (b) 24.7 MeV (c) 0.935 MeV (d) 1.935 MeV
54. ----- take part in a nuclear reaction.
 (a) Positrons (b) Protons (c) Electrons (d) Nucleons
55. Which of the following takes part in a chemical reaction? -----
 (a) Protons (b) Electrons (c) Neutrons (d) Positrons
56. A nuclear reaction is -----
 (a) reversible reaction (b) an endothermic reaction
 (c) an exothermic reaction (d) an irreversible reaction
57. Both reversible and irreversible reactions are possible in a -----
 (a) nuclear reaction (b) chemical reaction
 (c) physical process (d) atomic transmutation
58. Enormous amount of energy is released during -----
 (a) chemical reaction (b) nuclear reaction
 (c) an endothermic reaction (d) any reaction
59. Who discovered the bombardment of ${}_{92}\text{U}^{235}$ nucleus by thermal neutrons? -----
 (a) Otto Hahn (b) Strassman
 (c) Otto Hahn and Strassman (d) Rutherford
60. When ${}_{92}\text{U}^{235}$ is bombarded by a neutron the new nuclei formed are -----
 (a) ${}_{36}\text{Ba}^{141}$ and ${}_{56}\text{Kr}^{92}$ (b) ${}_{56}\text{Ba}^{141}$ and ${}_{36}\text{Kr}^{92}$
 (c) Ba^{141} and Kr^{92} (d) ${}_{36}\text{Ca}^{141}$ and ${}_{56}\text{Kr}^{93}$
61. How many neutrons are released when Uranium nucleus is split? -----
 (a) 2 (b) 4 (c) 6 (d) 3
62. The energy released per fission of ${}_{92}\text{U}^{235}$ nucleus is found to be -----
 (a) 24.7 MeV (b) 200 MeV (c) 100 MeV (d) 10^6 eV
63. The atomic number range of fission products is from -----
 (a) 24 to 58 (b) 34 to 88 (c) 24 to 68 (d) 34 to 58
64. The kinetic energy of a thermal neutron is -----
 (a) 1 eV (b) greater than 1eV (c) less than 1eV (d) 10 MeV
65. When fast moving neutrons pass through moderators, they are transformed into -----
 (a) very fast moving neutrons (b) very fast moving protons
 (c) thermal neutrons (d) thermal nucleons
66. ----- is efficient in causing a nuclear fission reaction.
 (a) Neutron (b) Proton (c) Electron (d) Thermal neutron

80. The important constituents of an atom bomb are -----
 (a) 99% of U^{238} , 0.72% of U^{235} (b) 99.28% of U^{238} & 0.72% of U^{235}
 (c) 99.28% of U^{238} & 0.36% of U^{235} (d) 99.28% of U^{238} & 0.72% of U^{235}
81. The first nuclear reactor was built in ----- at -----
 (a) 1924, Chicago (b) 1942, Chicago
 (c) 1942, California (d) 1942, Bombay
82. The average energy of slow moving neutrons is -----
 (a) 0.25 eV (b) 0.025 MeV (c) 0.45 MeV (d) 0.025 eV
83. In India, all power reactors use ----- as control rods.
 (a) cadmium (b) boron (c) cadmium carbide (d) boron carbide
84. The research reactor located at Indira Gandhi Centre for Atomic Research is at --

 (a) Duruva (b) Apsara (c) Kamini (d) Cirus
85. How many reactors are in operation in India's nuclear power programme? -----
 --
 (a) 12 (b) 14 (c) 16 (d) 10
86. In a reaction ${}_1H^3 + {}_1H^2 \rightarrow X + Y + \text{energy}$, X and Y are, -----
 (a) ${}_2He^3, {}_0n^1$ (b) ${}_1H^2, {}_0n^1$ (c) ${}_2He^4, {}_0n^1$ (d) ${}_1H^3, {}_0n^1$
87. The types of nuclear fusion reactions taking place in sun and star are -----
 (a) nuclear fusion, proton – proton cycle
 (b) nuclear fusion, carbon – nitrogen cycle
 (c) proton-proton cycle & carbon – nitrogen cycle
 (d) proton-proton cycle & triple alpha process
88. Reactor in Kalpakkam is -----
 (a) Research reactor (b) Breeder reactor
 (c) Nuclear reactor (d) Induction furnace
89. In nuclear fission -----
 (a) law of conservation of momentum is satisfied
 (b) mass energy relation is obeyed
 (c) law of diffusion is satisfied
 (d) conservation of mass is satisfied
90. Breeder reactor converts fertile material U^{238} into fissionable material -----
 (a) Plutonium – 239 (b) Thorium
 (c) Radium (d) Uranium – 235
91. The energy produced in the sun is due to -----
 (a) nuclear fission (b) nuclear fusion
 (c) chain reaction (d) explosion
92. In nuclear reactor ----- is used as a coolant.
 (a) water (b) cadmium rod (c) graphite rod (d) liquid sodium

93. The moderator used in nuclear reactor is -----
(a) Cadmium (b) Boron (c) Heavy water (d) Uranium
94. Rods of cadmium are used to -----
(a) activate the fission (b) liberate more neutron
(c) control fission process (d) stop fission
95. Fuel used in a reactor is -----
(a) wood (b) coal (c) electricity (d) enriched uranium
96. Which of the following is used as a moderator? -----
(a) Heavy water (b) Cadmium (c) Boron (d) Heavy water or graphite
97. Which elements are used to control the rate of nuclear reaction? -----
(a) Cadmium (b) Carbon (c) Hydrogen (d) Cadmium or boron
98. ----- acts as a coolant in a nuclear reactor
(a) Heavy water (b) Carbon (c) Cadmium (d) Boron
99. The temperature at which nuclear reaction takes place is -----
(a) 100 k (b) 10^5 k (c) 10^7 k (d) 10^9 k