

**Atomic models and Planck's quantum theory**

1. Rutherford's experiment on scattering of particles showed for the first time that the atom has
 - (a) Electrons
 - (b) Protons
 - (c) Nucleus
 - (d) Neutrons
2. Rutherford's scattering experiment is related to the size of the
 - (a) Nucleus
 - (b) Atom
 - (c) Electron
 - (d) Neutron
3. Rutherford's alpha particle scattering experiment eventually led to the conclusion that
 - (a) Mass and energy are related
 - (b) Electrons occupy space around the nucleus
 - (c) Neutrons are buried deep in the nucleus
 - (d) The point of impact with matter can be precisely determined
4. Bohr's model can explain
 - (a) The spectrum of hydrogen atom only
 - (b) Spectrum of atom or ion containing one electron only
 - (c) The spectrum of hydrogen molecule
5. When atoms are bombarded with alpha particles, only a few in million suffer deflection, others pass out undeflected. This is because
 - (a) The force of repulsion on the moving alpha particle is small
 - (b) The force of attraction on the alpha particle to the oppositely charged electrons is very small
 - (c) There is only one nucleus and large number of electrons
 - (d) The nucleus occupies much smaller volume compared to the volume of the atom
6. Positronium consists of an electron and a positron (a particle which has the same mass as an electron, but opposite charge) orbiting round their common centre of mass. Calculate the value of the Rydberg constant for this system.
 - (a) $R_{\infty}/4$
 - (b) $R_{\infty}/2$
 - (c) $2R_{\infty}$
 - (d) R_{∞}
7. When α -particles are sent through a thin metal foil, most of them go straight through the foil because (one or more are correct)



- (a) Alpha particles are much heavier than electrons
(b) Alpha particles are positively charged
(c) Most part of the atom is empty space
(d) Alpha particles move with high velocity
8. When an electron jumps from L to K shell
(a) Energy is absorbed
(b) Energy is released
(c) Energy is sometimes absorbed and sometimes released
(d) Energy is neither absorbed nor released
9. When beryllium is bombarded with α - particles, extremely penetrating radiations which cannot be deflected by electrical or magnetic field are given out. These are
(a) A beam of protons (b) α -rays
(c) A beam of neutrons (d) X-rays
10. Which one of the following is not the characteristic of Planck's quantum theory of radiation
(a) The energy is not absorbed or emitted in whole number or multiple of quantum
(b) Radiation is associated with energy
(c) Radiation energy is not emitted or absorbed continuously but in the form of small packets called quanta
(d) This magnitude of energy associated with a quantum is proportional to the frequency
11. The spectrum of He is expected to be similar to
(a) H (b) Li^+
(c) Na (d) He^+
12. Energy of orbit
(a) Increases as we move away from nucleus
(b) Decreases as we move away from nucleus
(c) Remains same as we move away from nucleus
(d) None of these
13. Bohr model of an atom could not account for
(a) Emission spectrum
(b) Absorption spectrum
(c) Line spectrum of hydrogen
(d) Fine spectrum
14. Existence of positively charged nucleus was established by
(a) Positive ray analysis
(b) α -ray scattering experiments
(c) X-ray analysis
(d) Discharge tube experiments





15. Electron occupies the available orbital singly before pairing in any one orbital occurs, it is
(a) Pauli's exclusion principle
(b) Hund's Rule
(c) Heisenberg's principle
(b) Prout's hypothesis
16. The wavelength of a spectral line for an electronic transition is inversely related to
(a) The number of electrons undergoing the transition
(b) The nuclear charge of the atom
(c) The difference in the energy of the energy levels involved in the transition
(d) The velocity of the electron undergoing the transition
17. When an electron drops from a higher energy level to a low energy level, then
(a) Energy is emitted
(b) Energy is absorbed
(c) Atomic number increases
(d) Atomic number decreases
18. Davisson and Germer's experiment showed that
(a) β -particles are electrons
(b) Electrons come from nucleus
(c) Electrons show wave nature
(d) None of the above
19. When an electron jumps from lower to higher orbit, its energy
(a) Increases
(b) Decreases
(c) Remains the same
(d) None of these
20. Experimental evidence for the existence of the atomic nucleus comes from
(a) Millikan's oil drop experiment
(b) Atomic emission spectroscopy
(c) The magnetic bending of cathode rays
(d) Alpha scattering by a thin metal foil
21. Which of the following statements does not form part of Bohr's model of the hydrogen atom
(a) Energy of the electrons in the orbit is quantized
(b) The electron in the orbit nearest the nucleus has the lowest energy
(c) Electrons revolve in different orbits around the nucleus
(d) The position and velocity of the electrons in the orbit cannot be determined simultaneously

