# ATOMIC STRUCTURE

Chapter 2 • Class 9 Chemistry • 80+ Solved MCQs

**With Ticked Answers & Detailed Explanations**

SCHOLAREYE.XYZ

# SECTION 1 | HISTORICAL BACKGROUND & DISCOVERY OF SUBATOMIC PARTICLES

**Q1. Who was the first philosopher to propose the idea that all matter is made of tiny indivisible particles called atoms?**

**A)** John Dalton

✔ **B) Democritus**

**C)** J.J. Thomson

**D)** Ernest Rutherford

**NOTE — Explanation:** Democritus, an ancient Greek philosopher, was the pioneer who introduced the concept of the atom as an indivisible particle.

**Q2. Which scientist provided the first experimental evidence for the existence of atoms through his work with chemical compounds?**

**A)** Democritus

✔ **B) John Dalton**

**C)** Niels Bohr

**D)** E. Goldstein

**NOTE — Explanation:** John Dalton conducted experiments in the early 1800s that provided scientific evidence for atoms, moving the concept from philosophy to chemistry.

**Q3. What was the primary observation in a discharge tube experiment when high voltage was applied to a gas at low pressure?**

**A)** The gas turned into a solid.

✔ **B) The glass surface behind the positive electrode started to glow.**

**C)** The positive electrode melted.

**D)** The gas exploded.

**NOTE — Explanation:** The glow occurred because rays emitted from the cathode (cathode rays) hit the glass behind the anode, causing fluorescence.

**Q4. Cathode rays were discovered to consist of:**

**A)** Positively charged particles.

✔ **B) Negatively charged particles.**

**C)** Neutral particles.

**D)** Gamma rays.

**NOTE — Explanation:** J.J. Thomson showed that cathode rays bent towards a positively charged plate, proving they carry a negative charge.

**Q5. Who is credited with the discovery of the electron and the calculation of its charge-to-mass ratio?**

**A)** E. Goldstein

**B)** James Chadwick

✔ **C) J.J. Thomson**

**D)** Lord Rutherford

**NOTE — Explanation:** J.J. Thomson used magnetic and electric fields to deflect cathode rays, calculating their mass-to-charge ratio and identifying them as electrons.

**Q6. Canal rays (or anode rays) were discovered by:**

✔ **A) E. Goldstein**

**B)** J.J. Thomson

**C)** John Dalton

**D)** Niels Bohr

**NOTE — Explanation:** Goldstein observed a new type of ray moving from the anode towards the cathode in a perforated cathode discharge tube. These were later identified as protons.

**Q7. Which subatomic particle was discovered by James Chadwick in 1933?**

**A)** Electron

**B)** Proton

✔ **C) Neutron**

**D)** Positron

**NOTE — Explanation:** Chadwick discovered the neutron, a neutral particle with a mass almost equal to that of a proton.

**Q8. In Rutherford's gold foil experiment, what was the major conclusion drawn from the fact that most alpha particles passed straight through the foil?**

**A)** The atom is mostly empty space.

**B)** The nucleus is positively charged.

✔ **C) The atom consists of a small, dense nucleus surrounded by mostly empty space.**

**D)** Electrons are embedded in a positively charged sphere.

**NOTE — Explanation:** While A and C are related, the *major* conclusion was the structure of the atom: a tiny, dense nucleus with a large surrounding empty space.

**Q9. What did Rutherford conclude about the mass of an atom based on his experiment?**

✔ **A) Almost all the mass is concentrated in the nucleus.**

**B)** Mass is evenly distributed throughout the atom.

**C)** The mass is concentrated in the electron cloud.

**D)** Atoms have no mass.

**NOTE — Explanation:** The deflection of some alpha particles indicated a massive, dense central core (the nucleus) containing almost all the atom's mass.

**Q10. Who proposed the model where electrons revolve around the nucleus in fixed circular paths called orbits or shells?**

**A)** Rutherford

✔ **B) Niels Bohr**

**C)** J.J. Thomson

**D)** Dalton

**NOTE — Explanation:** Bohr's atomic model introduced the concept of quantized energy levels or shells where electrons orbit the nucleus without radiating energy.

# SECTION 2 | ATOMIC MODELS, SUBATOMIC PARTICLES & CONFIGURATION

**Q11. Which subatomic particle has a relative charge of -1 and a mass approximately 1/1836 times that of a proton?**

✔ **A) Electron**

**B)** Proton

**C)** Neutron

**D)** Nucleon

**NOTE — Explanation:** The electron is extremely light compared to protons and neutrons, with a negligible mass in atomic terms.

**Q12. What is the charge of a neutron?**

**A)** +1

**B)** -1

✔ **C) 0 (Neutral)**

**D)** +2

**NOTE — Explanation:** Neutrons are electrically neutral particles found in the nucleus.

**Q13. According to Bohr's model, which shell is closest to the nucleus and has the minimum energy?**

✔ **A) K shell**

**B)** L shell

**C)** M shell

**D)** N shell

**NOTE — Explanation:** The K shell (n=1) is closest to the nucleus. Electrons in this shell have the lowest energy state (ground state).

**Q14. What is the maximum number of electrons that can be accommodated in the M shell (n=3)?**

**A)** 2

**B)** 8

✔ **C) 18**

**D)** 32

**NOTE — Explanation:** Using the formula 2n2, where n=3, the maximum capacity is 2 x (3)2 = 18 electrons.

**Q15. Which subshells are present in the third shell (n=3)?**

**A)** s and p only

✔ **B) s, p, and d**

**C)** s, p, d, and f

**D)** p and d only

**NOTE — Explanation:** The number of subshells equals the shell number (n). For n=3, the subshells are s, p, and d.

**Q16. What is the maximum number of electrons that can be accommodated in a 'd' subshell?**

**A)** 2

**B)** 6

✔ **C) 10**

**D)** 14

**NOTE — Explanation:** The d subshell has 5 orbitals, and each orbital can hold 2 electrons, giving a maximum capacity of 10 electrons.

**Q17. The modern atomic model describes electrons as:**

**A)** Solid particles orbiting like planets.

✔ **B) Charged clouds with a probability of being found at a certain distance.**

**C)** Stationary particles in the nucleus.

**D)** Particles with definite, predictable paths.

**NOTE — Explanation:** The modern quantum mechanical model uses the concept of probability clouds (orbitals) rather than fixed circular orbits.

**Q18. Which of the following represents the correct order of increasing energy of shells?**

✔ **A) K < L < M < N**

**B)** N < M < L < K

**C)** L < K < M < N

**D)** M < L < K < N

**NOTE — Explanation:** Energy increases as you move away from the nucleus. K is closest (lowest energy), N is furthest (highest energy).

**Q19. Which fundamental particle is present in all atoms except ordinary hydrogen?**

**A)** Electron

**B)** Proton

✔ **C) Neutron**

**D)** Positron

**NOTE — Explanation:** Ordinary hydrogen (protium) has 1 proton and 0 neutrons. All other elements have neutrons in their nuclei.

**Q20. What is the charge and mass of a proton?**

**A)** Charge = -1.602 x 10^-19 C, Mass = 9.109 x 10^-31 kg

✔ **B) Charge = +1.602 x 10^-19 C, Mass = 1.673 x 10^-27 kg**

**C)** Charge = 0, Mass = 1.675 x 10^-27 kg

**D)** Charge = +1.602 x 10^-19 C, Mass = 9.109 x 10^-31 kg

**NOTE — Explanation:** Protons carry a positive charge equal in magnitude to the electron's charge, but they are significantly heavier (approx. 1836 times).

## SECTION 3 | ATOMIC NUMBER, MASS NUMBER & ISOTOPES

**Q21. The atomic number (Z) of an element is defined as the number of:**

✔ **A) Protons in the nucleus.**

**B)** Neutrons in the nucleus.

**C)** Nucleons in the nucleus.

**D)** Electrons in the outermost shell.

**NOTE — Explanation:** The atomic number is unique to each element and determines its identity in the periodic table.

**Q22. In a neutral atom, the number of electrons is always equal to the number of:**

**A)** Neutrons

✔ **B) Protons**

**C)** Nucleons

**D)** Isotopes

**NOTE — Explanation:** Atoms are electrically neutral, so the positive charge of protons must equal the negative charge of electrons.

**Q23. The mass number (A) of an atom is the sum of:**

**A)** Protons and electrons

✔ **B) Protons and neutrons**

**C)** Neutrons and electrons

**D)** Only protons

**NOTE — Explanation:** Mass number represents the total mass of the atom, which is concentrated in the nucleus (protons + neutrons). Electrons have negligible mass.

**Q24. How is the number of neutrons (N) in an atom calculated?**

**A)** N = Z + A

✔ **B) N = A - Z**

**C)** N = A + Z

**D)** N = Z - A

**NOTE — Explanation:** Mass Number (A) = Protons (Z) + Neutrons (N). Therefore, Neutrons (N) = A - Z.

**Q25. What is the standard notation for an atom of oxygen with atomic number 8 and mass number 16?**

**A)** superscript 8 subscript 16 O

✔ **B) superscript 16 subscript 8 O**

**C)** superscript 24 subscript 8 O

**D)** superscript 8 O subscript 16

**NOTE — Explanation:** The convention is to write the mass number as a superscript (top left) and the atomic number as a subscript (bottom left).

**Q26. Isotopes of an element have the same:**

**A)** Mass number

✔ **B) Atomic number**

**C)** Number of neutrons

**D)** Physical properties

**NOTE — Explanation:** Isotopes are atoms of the same element (same atomic number/protons) but with different numbers of neutrons.

**Q27. Which of the following are the three isotopes of hydrogen?**

✔ **A) Protium, Deuterium, Tritium**

**B)** Carbon-12, Carbon-13, Carbon-14

**C)** Hydrogen-1, Hydrogen-2, Hydrogen-4

**D)** Alpha, Beta, Gamma

**NOTE — Explanation:** Hydrogen has three naturally occurring isotopes: H-1 (Protium), H-2 (Deuterium), and H-3 (Tritium).

**Q28. Why do isotopes of an element exhibit nearly identical chemical properties?**

**A)** They have the same number of neutrons.

✔ **B) They have the same number of electrons.**

**C)** They have the same mass number.

**D)** They have the same physical state.

**NOTE — Explanation:** Chemical properties are determined by the electronic configuration (number and arrangement of electrons), which is identical for isotopes of the same element.

**Q29. The isotope of carbon used in radiocarbon dating is:**

**A)** Carbon-12

**B)** Carbon-13

✔ **C) Carbon-14**

**D)** Carbon-15

**NOTE — Explanation:** Carbon-14 is radioactive and is used to determine the age of organic archaeological artifacts.

**Q30. Which of the following statements about isotopes is FALSE?**

**A)** They have the same atomic number.

**B)** They have different mass numbers.

✔ **C) They have identical physical properties.**

**D)** They occupy the same position in the periodic table.

**NOTE — Explanation:** Because isotopes have different masses, their physical properties (like density, melting point, etc.) can differ slightly.

**Q31. What is the atomic number of an element that has 25 protons?**

✔ **A) 25**

**B)** 50

**C)** 12.5

**D)** Cannot be determined

**NOTE — Explanation:** The atomic number is defined by the number of protons. Therefore, it is 25.

**Q32. An atom has a mass number of 39 and an atomic number of 19. How many neutrons does it have?**

**A)** 19

✔ **B) 20**

**C)** 39

**D)** 58

**NOTE — Explanation:** Neutrons = Mass Number - Atomic Number = 39 - 19 = 20.

**Q33. Which of the following is an isotope of Carbon-12?**

**A)** An atom with 6 protons and 7 neutrons

**B)** An atom with 7 protons and 6 neutrons

✔ **C) An atom with 6 protons and 6 neutrons**

**D)** An atom with 6 protons and 8 electrons

**NOTE — Explanation:** Carbon always has 6 protons. Carbon-12 has a mass number of 12, so it has 6 protons and 6 neutrons (6+6=12).

**Q34. The symbol for sulfur-32 (atomic number 16) represents a sulfur atom. How many electrons are present in a neutral sulfur atom?**

**A)** 32

✔ **B) 16**

**C)** 48

**D)** 8

**NOTE — Explanation:** The atomic number (16) tells us the number of protons. In a neutral atom, protons = electrons. So, 16 electrons.

**Q35. Which of the following subatomic particles is NOT found in the nucleus of an atom?**

**A)** Proton

**B)** Neutron

✔ **C) Electron**

**D)** Nucleon

**NOTE — Explanation:** Electrons revolve around the nucleus in shells/orbitals. Protons and neutrons reside inside the nucleus.

## SECTION 4 | RADIOACTIVITY, IONS & APPLICATIONS

**Q36. What is the process called when an unstable nucleus emits excess energy in the form of radiation?**

**A)** Ionization

✔ **B) Radioactivity**

**C)** Oxidation

**D)** Distillation

**NOTE — Explanation:** Radioactivity is the spontaneous emission of radiation from an unstable atomic nucleus.

**Q37. When a radioactive element emits radiation, it transforms into:**

**A)** A stable element always.

✔ **B) Another chemical element.**

**C)** An isotope of the same element.

**D)** A compound.

**NOTE — Explanation:** Radioactive decay changes the number of protons in the nucleus, thereby changing the element itself into a different element.

**Q38. Which of the following is a radioactive isotope of hydrogen?**

**A)** Protium

**B)** Deuterium

✔ **C) Tritium**

**D)** Helium

**NOTE — Explanation:** Tritium (H-3) is radioactive, whereas Protium (H-1) and Deuterium (H-2) are stable isotopes.

**Q39. In the radioactive decay of Uranium-238 to Thorium-234, what type of radiation is likely emitted?**

**A)** Beta particle

✔ **B) Alpha particle**

**C)** Gamma ray

**D)** X-ray

**NOTE — Explanation:** The mass number decreases by 4 (238 to 234) and the atomic number decreases by 2 (92 to 90), which corresponds to the emission of an alpha particle (He-4).

**Q40. Technetium-99m is widely used in medicine for:**

**A)** Treating cancer directly.

✔ **B) Diagnostic imaging of organs like the brain and lungs.**

**C)** Sterilizing surgical instruments.

**D)** Measuring bone density.

**NOTE — Explanation:** Technetium-99m is a radioactive tracer used in medical imaging to diagnose diseases by allowing doctors to visualize organ function.

**Q41. What is the primary use of radiocarbon dating?**

**A)** Determining the age of rocks.

✔ **B) Determining the age of historical objects containing organic material.**

**C)** Measuring the temperature of stars.

**D)** Testing the strength of metals.

**NOTE — Explanation:** Carbon-14 is absorbed by living things. When they die, it decays at a known rate, allowing scientists to date the remains (up to ~50,000 years).

**Q42. When an atom loses an electron, it forms:**

✔ **A) A positively charged ion (cation).**

**B)** A negatively charged ion (anion).

**C)** A neutral atom.

**D)** An isotope.

**NOTE — Explanation:** Losing a negatively charged electron leaves the atom with more protons than electrons, resulting in a net positive charge (cation).

**Q43. When an atom gains an electron, it forms:**

**A)** A cation.

✔ **B) An anion.**

**C)** A radioactive isotope.

**D)** A proton.

**NOTE — Explanation:** Gaining an extra electron gives the atom a net negative charge, forming an anion.

**Q44. In the ionization of a sodium atom (Na) by a radioactive source, the resulting cation is represented as:**

**A)** Na-

✔ **B) Na+**

**C)** Na2+

**D)** Na

**NOTE — Explanation:** Sodium loses one electron to achieve a stable noble gas configuration, forming a +1 cation (Na+).

**Q45. Which type of radiation has enough energy to remove tightly bound electrons from an atom's orbit?**

**A)** Radio waves

**B)** Microwaves

✔ **C) Ionizing radiation**

**D)** Infrared radiation

**NOTE — Explanation:** Ionizing radiation (like alpha, beta, gamma rays) carries enough energy to knock electrons out of atoms, creating ions.

**Q46. What determines the chemical properties of an element?**

**A)** The number of neutrons.

✔ **B) The number and arrangement of electrons.**

**C)** The mass number.

**D)** The number of isotopes.

**NOTE — Explanation:** The electronic configuration, especially the valence electrons, dictates how an element will react chemically.

**Q47. Which of the following statements about radioactive decay is TRUE?**

**A)** It is a spontaneous process.

**B)** It results in the emission of particles or energy.

**C)** It changes the identity of the element.

✔ **D) All of the above.**

**NOTE — Explanation:** Radioactive decay is spontaneous, involves emission of radiation, and transforms the nucleus into a different element.

**Q48. The symbol for a cation formed from an atom X with a +2 charge is:**

**A)** X-2

✔ **B) X2+**

**C)** X2 (with plus as subscript)

**D)** X+2

**NOTE — Explanation:** The charge is written as a superscript after the symbol, with the number preceding the sign (e.g., Mg2+).

**Q49. What happens to the mass number of an atom during beta decay?**

**A)** It decreases by 4.

**B)** It decreases by 2.

✔ **C) It remains unchanged.**

**D)** It increases by 1.

**NOTE — Explanation:** In beta decay, a neutron turns into a proton and an electron. The mass number remains the same, but the atomic number increases by 1.

**Q50. Radiocarbon dating relies on the ratio of which two isotopes in a dead sample?**

**A)** Carbon-12 and Carbon-13

✔ **B) Carbon-14 and Carbon-12**

**C)** Carbon-14 and Carbon-13

**D)** Carbon-12 and Hydrogen-1

**NOTE — Explanation:** The method measures the proportion of radioactive Carbon-14 to stable Carbon-12 to estimate the time elapsed since the organism died.

# SECTION 5 | RELATIVE ATOMIC MASS & CALCULATIONS

**Q51. What is the standard reference used today for the atomic mass unit (amu)?**

**A)** Hydrogen-1

**B)** Oxygen-16

✔ **C) Carbon-12**

**D)** Nitrogen-14

**NOTE — Explanation:** In 1961, the international scientific community agreed to use 1/12th the mass of a Carbon-12 atom as the standard atomic mass unit.

**Q52. 1 atomic mass unit (amu) is equal to:**

**A)** 1.67377 x 10^-27 kg

✔ **B) 1.66056 x 10^-27 kg (approx.)**

**C)** 9.109 x 10^-31 kg

**D)** 6.022 x 10^23 kg

**NOTE — Explanation:** By definition, 1 amu is exactly 1/12th the mass of a C-12 atom, which equals approximately 1.66 x 10^-27 kg.

**Q53. The relative atomic mass of an element is the mass of an atom relative to:**

**A)** The mass of a proton.

**B)** The mass of an electron.

✔ **C) 1/12th the mass of a Carbon-12 atom.**

**D)** The mass of a neutron.

**NOTE — Explanation:** This is the modern definition of relative atomic mass, ensuring consistency across measurements.

**Q54. If an element has two isotopes with masses m1 and m2 and abundances p1 and p2, the relative atomic mass is calculated as:**

**A)** (m1 + m2) / 2

**B)** (m1 x m2) / 100

✔ **C) (m1p1 + m2p2) / 100**

**D)** (m1 + m2) / (p1 + p2)

**NOTE — Explanation:** The relative atomic mass is the weighted average of the isotopic masses based on their natural abundances.

**Q55. Using the isotopic abundance data for Krypton: 80 (2.0%), 82 (12.0%), 83 (12.0%), 84 (57.0%), 85 (17.0%). What is the relative atomic mass of Krypton?**

**A)** 82.5

✔ **B) 83.7**

**C)** 84.2

**D)** 85.0

**NOTE — Explanation:** (80x2 + 82x12 + 83x12 + 84x57 + 85x17) / 100 = (160 + 984 + 996 + 4788 + 1445) / 100 = 8373/100 = 83.73.

**Q56. Chlorine has two isotopes: Cl-35 (abundance 75.77%) and Cl-37 (abundance 24.23%). If the relative atomic mass is 35.45, what is the mass of the lighter isotope?**

**A)** 34.00

✔ **B) 34.95**

**C)** 35.00

**D)** 36.95

**NOTE — Explanation:** Let x be the mass of lighter isotope. 35.45 = (x x 75.77 + 37 x 24.23) / 100. Solving for x gives approximately 34.95 amu.

**Q57. Calculate the relative atomic mass of Lead (Pb) given isotopic abundances: Pb-204 (2.0%), Pb-206 (24.0%), Pb-207 (22.0%), Pb-208 (52.0%).**

✔ **A) 207.24**

**B)** 206.00

**C)** 207.50

**D)** 208.00

**NOTE — Explanation:** (204x2 + 206x24 + 207x22 + 208x52) / 100 = (408 + 4944 + 4554 + 10816) / 100 = 20722 / 100 = 207.22.

**Q58. The relative atomic mass of an element is often not a whole number because:**

**A)** Electrons contribute to the mass.

✔ **B) Elements exist as a mixture of isotopes with different abundances.**

**C)** The amu standard is inaccurate.

**D)** Atoms lose mass during chemical reactions.

**NOTE — Explanation:** The weighted average of the masses of naturally occurring isotopes usually results in a fractional value.

**Q59. If the atomic mass of an element is 35.5 amu, it implies that:**

**A)** Every atom of the element has a mass of 35.5 amu.

✔ **B) The average mass of its atoms is 35.5 amu.**

**C)** It has only one isotope.

**D)** It has 35.5 protons.

**NOTE — Explanation:** Relative atomic mass is an average value; individual atoms have integer mass numbers (e.g., 35 or 37).

**Q60. Which of the following is the correct unit for relative atomic mass?**

**A)** Grams

**B)** Kilograms

✔ **C) Atomic Mass Unit (amu)**

**D)** Moles

**NOTE — Explanation:** Relative atomic masses are expressed in atomic mass units (amu) or simply as a dimensionless relative number.

**Q61. The mass of one atom of Hydrogen-1 on the atomic mass scale is approximately:**

**A)** 1.000 amu

✔ **B) 1.007 amu**

**C)** 2.014 amu

**D)** 0.0005 amu

**NOTE — Explanation:** Due to the mass of the electron and binding energy, the relative atomic mass of Hydrogen-1 is slightly more than 1 amu (specifically ~1.00794 amu).

**Q62. Which of the following isotopes is used as the standard for the atomic mass scale?**

**A)** Hydrogen-1

**B)** Oxygen-16

✔ **C) Carbon-12**

**D)** Carbon-14

**NOTE — Explanation:** Carbon-12 is the standard reference isotope for defining the atomic mass unit.

**Q63. The mass number of an atom is 137 and its atomic number is 56 (Barium). How many neutrons are present?**

**A)** 56

✔ **B) 81**

**C)** 137

**D)** 193

**NOTE — Explanation:** Neutrons = Mass number - Atomic number = 137 - 56 = 81.

**Q64. In the notation for Platinum-195 (atomic number 78), what does the number 195 represent?**

**A)** Number of protons

**B)** Number of neutrons

✔ **C) Mass number**

**D)** Number of electrons

**NOTE — Explanation:** The superscript denotes the mass number (total protons + neutrons).

**Q65. In the notation for Manganese-55 (atomic number 25), what does the number 25 represent?**

✔ **A) Atomic number**

**B)** Mass number

**C)** Number of neutrons

**D)** Number of nucleons

**NOTE — Explanation:** The subscript denotes the atomic number (number of protons).

**Q66. How many electrons are present in a neutral atom of Iodine-127 (atomic number 53)?**

**A)** 127

**B)** 74

✔ **C) 53**

**D)** 180

**NOTE — Explanation:** In a neutral atom, the number of electrons equals the atomic number (subscript). Here, it is 53.

**Q67. What is the relative atomic mass of an element if its isotopic abundance is 20% for mass 10 and 80% for mass 11?**

**A)** 10.2

✔ **B) 10.8**

**C)** 11.0

**D)** 10.5

**NOTE — Explanation:** (10 x 20 + 11 x 80) / 100 = (200 + 880) / 100 = 1080 / 100 = 10.8.

**Q68. Which of the following pairs are isotopes?**

**A)** Carbon-12 and Nitrogen-14

✔ **B) Carbon-12 and Carbon-14**

**C)** Sodium-23 and Magnesium-24

**D)** Hydrogen-1 and Helium-4

**NOTE — Explanation:** Isotopes have the same atomic number (protons) but different mass numbers. Both C-12 and C-14 have 6 protons.

**Q69. An atom has 18 electrons, 20 neutrons, and 19 protons. What is the charge on this atom?**

**A)** -1

✔ **B) +1**

**C)** 0

**D)** +2

**NOTE — Explanation:** The atom has 19 positive charges (protons) and 18 negative charges (electrons). 19 - 18 = +1 net charge.

**Q70. Which of the following statements is true regarding the mass of an atom?**

✔ **A) The mass of an electron is negligible compared to protons and neutrons.**

**B)** The mass of an electron is equal to the mass of a proton.

**C)** The mass of a neutron is half that of a proton.

**D)** The mass of an atom is mostly due to its electrons.

**NOTE — Explanation:** Electrons are about 1/1836th the mass of a proton, so the atomic mass is essentially the sum of protons and neutrons in the nucleus.

**Q71. The relative atomic mass of Chlorine is 35.45. This indicates that Chlorine exists as:**

**A)** A single isotope.

✔ **B) A mixture of isotopes.**

**C)** A radioactive element.

**D)** A diatomic molecule.

**NOTE — Explanation:** Fractional atomic masses are characteristic of elements existing as a mixture of isotopes.

**Q72. Which subatomic particle determines the isotope of an element?**

✔ **A) Neutron**

**B)** Proton

**C)** Electron

**D)** Positron

**NOTE — Explanation:** Changing the number of neutrons creates a different isotope of the same element. Changing protons changes the element itself.

**Q73. The isotope Uranium-238 decays to Thorium-234. What type of decay is this?**

✔ **A) Alpha decay**

**B)** Beta decay

**C)** Gamma decay

**D)** Positron emission

**NOTE — Explanation:** Mass number decreases by 4 and atomic number decreases by 2, which is characteristic of alpha decay.

**Q74. Which of the following is NOT a fundamental particle of an atom?**

**A)** Electron

**B)** Proton

**C)** Neutron

✔ **D) Molecule**

**NOTE — Explanation:** Electrons, protons, and neutrons are subatomic/fundamental particles. A molecule is a group of atoms bonded together.

**Q75. If the atomic number of an element is Z and its mass number is A, the number of neutrons is:**

**A)** A + Z

✔ **B) A - Z**

**C)** Z - A

**D)** A x Z

**NOTE — Explanation:** Mass number (A) = Protons (Z) + Neutrons (N). Rearranging gives Neutrons (N) = A - Z.

**Q76. The maximum number of electrons in the L shell (n=2) is:**

**A)** 2

✔ **B) 8**

**C)** 18

**D)** 32

**NOTE — Explanation:** Using 2n2, where n=2, 2 x (2)2 = 8.

**Q77. Which of the following is an example of a cation?**

**A)** Cl-

✔ **B) Na+**

**C)** O2-

**D)** F-

**NOTE — Explanation:** A cation is a positively charged ion formed by losing electrons. Na+ has lost one electron.

**Q78. What is the relative charge of an electron?**

**A)** +1

✔ **B) -1**

**C)** 0

**D)** -2

**NOTE — Explanation:** Electrons carry a fundamental negative charge of -1.

**Q79. Rutherford's gold foil experiment led to the discovery of:**

**A)** Electrons

**B)** Protons

✔ **C) The nucleus**

**D)** Neutrons

**NOTE — Explanation:** The deflection of alpha particles revealed a tiny, dense, positively charged center, which Rutherford named the nucleus.

**Q80. Which isotope is used in the medical imaging of organs like the brain and lungs?**

**A)** Carbon-14

**B)** Uranium-238

✔ **C) Technetium-99m**

**D)** Tritium

**NOTE — Explanation:** Technetium-99m is a metastable isotope widely used in nuclear medicine for diagnostic imaging.

**Q81. In the formula 2n2, what does 'n' represent?**

**A)** Number of neutrons

✔ **B) Shell number or energy level**

**C)** Number of electrons

**D)** Atomic number

**NOTE — Explanation:** 'n' represents the principal quantum number (shell number: 1, 2, 3...).

**Q82. Which of the following is TRUE about an anion?**

**A)** It is positively charged.

✔ **B) It is formed by gaining electrons.**

**C)** It has more protons than electrons.

**D)** It is always radioactive.

**NOTE — Explanation:** Anions are negatively charged ions formed when an atom gains one or more electrons.

# WELL DONE!

You have completed all 82 MCQs on Atomic Structure.
Keep revising the explanations to master every concept.

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