ATOMIC MODELS EXERCISE

- 1. Which of the following has a positive charge?
 - (a) proton
 - (b) neutron
 - (c) anion
 - (d) electron
 - (e) atom

2. Rutherford carried out experiments in which a beam of alpha particles was directed at a thin piece of metal foil. From these experiments he concluded that:

(a) electrons are massive particles.

(b) the positively charged parts of atoms are moving about with a velocity approaching the speed of light.

(c) the positively charged parts of atoms are extremely small and extremely heavy particles.

- (d) the diameter of an electron is approximately equal to that of the nucleus.
- (e) electrons travel in circular orbits around the nucleus.
- **3.** Consider the species ⁷²Zn, ⁷⁵As and ⁷⁴Ge. These species have:
 - a) the same number of electrons.
 - b) the same number of protons.
 - c) the same number of neutrons.
 - d) the same number of protons and neutrons.
 - e) the same mass number.

4. The neutral atoms of all of the isotopes of the same element have

- (a) different numbers of protons.
- (b) equal numbers of neutrons.
- (c) the same number of electrons.
- (d) the same mass numbers.
- (e) the same masses.

5. The Heisenberg Principle states that _____

- a) no two electrons in the same atom can have the same set of four quantum numbers.
- b) two atoms of the same element must have the same number of protons.
- c) it is impossible to determine accurately both the position and momentum of an electron simultaneously.
- d) electrons of atoms in their ground states enter energetically equivalent sets of orbitals singly before they pair up in any orbital of the set.
- e) charged atoms (ions) must generate a magnetic field when they are in motion.

6. Which statement about the four quantum numbers which describe electrons in atoms is **incorrect**?

- a) n = principal quantum number, n = 1, 2, 3,
- b) l = subsidiary (or azimuthal) quantum number, l = 1, 2, 3, ..., (n+1)
- c) m_l = magnetic quantum number, m_l = (-*l*),, 0,, (+*l*)

- d) $m_s = spin quantum number, m_s = +1/2 \text{ or } -1/2.$
- e) The magnetic quantum number is related to the orientation of atomic orbitals in space.

7. Who discovered electron?

- a. Rutherford.
- b. J. J. Thomson.
- c. Neils Bohr.
- d. James Chadwick.

8. Who proposed the First atomic theory?

- a) John Dalton.
- b) Robert Millikan.
- c) J. J. Thomson.
- d) Neils Bohr.

9. The electronic configuration for oxygen is written as 1s2 2s2 2p4. Which rule will this configuration be violating?

- a) Aufbau's principle.
- b) Hund's rule.
- c) Pauli's exclusion principle.
- d) None of the above.

10. Who of the following was awarded the Nobel Prize for his measurement of elementary electronic charge?

- a) Rutherford
- b) Robert Millikan
- c) James Chadwick
- d) JJ Thomson

11. How are the subshells in an atom labelled?

- a) s, p, d, f, g
- b) s, p, f, g, d
- c) s, f, g, d, f
- d) s, d, g, p, f

12. Atoms which have same mass number but different atomic number are called

- a) isotopes
- b) isomers
- c) isotones
- d) isobars
- 13. Experimentation with cathode ray led to the discovery of
 - a) electron

- b) proton
- c) neutron
- d) nucleus
- 14. Atomic mass of an element is equal to
 - a) mass of electron
 - b) mass of neutron
 - c) the sum of mass of proton and neutron
 - d) the sum of mass of electron and proton

15. Who explained the behavior of positively charged particles being deflected from a metal fousceil as the nucleus

- a) Ernest Rutherford
- b) James Chadwick
- c) John Dalton
- d) Niels Bohr

16. In the gold foil experiment, most of the particles fired at the foil

- a) bounced back
- b) were absorbed by the foil
- c) passed through the foil
- d) combined at the foil

17. Which of the following statement is wrong about electron

- a) It is a particle
- b) Its motion is affected by magnetic field
- c) It has wave like property
- d) It emits energy while moving in orbit
- 18. The gold foil experiment led to the discovery of
 - a) cathode ray
 - b) electron
 - c) neutron
 - d) proton
- 19. Principle quantum number describes
 - a) size of the orbital
 - b) shape of the orbital
 - c) spin of the orbital
 - d) orientation of the orbital

20. Anode rays were discovered by

- a) Rutherford
- b) Goldstein
- c) J J Thomson
- d) J. Stoney

Answers key

1. a 2. c 3. c 4. c 5. c 6. b 7. b 8. a 9. d 10. b

11. a 12. d 13. a 14. c 15. A 16. c 17. d 18. a 19. a 20. b