ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

SOLUTION-24(CLASS-11)

TOPIC- STRUCTURE OF ATOM

SUBTOPIC-ATOMIC ORBITALS AND QUANTUM NUMBERS

SUBJECT – CHEMISTRY **F.M. - 15**

DURATION – 30 mins **DATE -18.07.20**

1.1 **Which of the following conclusions could not be derived from Rutherford's α -particle scattering experiment?**

(a) Most of the space in the atom is empty (b)The radius of the atom is about 10^{-10} m while that of nucleus is 10^{-15} m (c) Electrons move in a circular path of fixed energy called orbits (d) Electrons and the nucleus are held together by electrostatic forces of attraction.

Ans. c

1.**2** Which of the following options does not represent ground state electronic configuration of an atom?

(a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8\ 4s^2$

(b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^9\ 4s^2$

(c)$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^1$

(d)$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^1$

Ans. b

1.3 **The probability density plots of 1s and 2s orbitals are given in Fig. 2.1:**

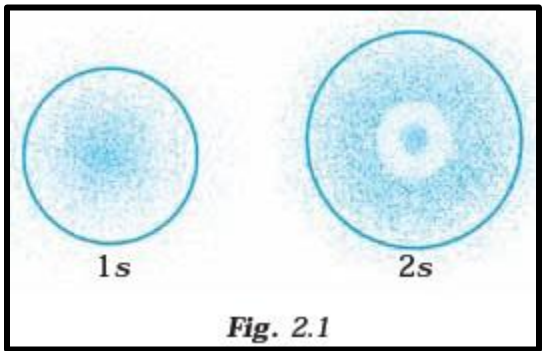

Fig. 2.1

The density of dots in a region represents the probability density of finding electrons in the region. On the basis of above diagram which of the following statements is incorrect?

a) 1s and 2s orbitals are spherical in shape b) The probability of finding the electron is maximum near the nucleus c) The probability of finding the electron at a given distance is equal in all directions d) The probability density of electrons for 2s orbital decreases uniformly as distance from the nucleus increases.

Ans. d

1.4 **Which of the following statement is not correct about the characteristics of cathode rays?**

(a) They start from the cathode and move towards the anode

(b)They travel in straight line in the absence of an external electrical or magnetic field

(c) Characteristics of cathode rays do not depend upon the material of electrodes in cathode ray tube
(d) Characteristics of cathode rays depend upon the nature of gas present in the cathode ray tube
Ans. d

1.5**Which of the following statements about the electron is incorrect?**
(a) It is a negatively charged particle (b) The mass of electron is equal to the mass of neutron(c) It is a basic constituent of all atoms (d) It is a constituent of cathode rays
Ans. b

1.6 **Which of the following properties of atom could be explained correctly by Thomson Model of atom?**
(a) Overall neutrality of atom(b) Spectra of hydrogen atom
(c) Position of electrons, protons and neutrons in atom (d) Stability of atom
Ans. a

1.7 **Two atoms are said to be isobars if**
(a) They have same atomic number but different mass number
(b) They have same number of electrons but different number of neutrons
(c) They have same number of neutrons but different number of electrons
(d) Sum of the number of protons and neutrons is same but the number of protons is different
Ans. d

1.8 **The number of radial nodes for 3p orbital is _____**
(a) 3 (b) 4 (c) 2 (d) 1
Ans. d

1.9 **Number of angular nodes for 4d orbital is _____**
(a) 4 (b) 3(c) 2(d) 1
Ans. c

1.10**Which of the following is responsible to rule out the existence of definite paths or trajectories of electrons?**
(a) Pauli's exclusion principle(b) Heisenberg's uncertainty principle
(c) Hund's rule of maximum multiplicity(d) Aufbau principle
Ans. b

1.11 **Total number of orbitals associated with third shell will be _____**
(a) 2 (b) 4 (c) 9(d) 3
Ans. c

1.12 **Orbital angular momentum depends on _____**
(a) l(b) n and l(c) n and m(d) m and s
Ans. a

1.13 **Chlorine exists in two isotopic forms, Cl-37 and Cl-35 but its atomic mass is 35.5. This indicates the ratio of Cl-37 and Cl-35 is approximately**

(a) 1:2 (b) 1:1(c) 1:3 (d) 3:1

Ans. c

1.14 **The pair of ions having same electronic configuration is _____**

(a) Cr^{3+}, Fe^{3+} (b) Fe^{3+}, Mn^{2+}(c) Fe^{3+}, Co^{3+} (d) Sc^{3+}, Cr^{3+}

Ans. b

1.15 **If travelling at same speeds, which of the following matter waves have the shortest wavelength?**

(a) Electron(b) Alpha particle (He^{2+})(c) Neutron(d) Proton

Ans. d

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