ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

WORKSHEET-23(CLASS-11)

TOPIC- STRUCTURE OF ATOM

SUBTOPIC-ATOMIC ORBITALS AND QUANTUM NUMBERS

SUBJECT – CHEMISTRY **F.M. - 15**

DURATION – 30 mins **DATE -13.07.20**

1.1 **The orbital angular momentum for an electron revolving in an orbit is given by $\sqrt{l(l+1)}.\frac{h}{2\pi}$. This momentum from an p-electron will be given by-**

(a) $+\frac{1}{2}.\frac{h}{2\pi}$ (b) zero (c) $\frac{h}{2\pi}$ (d) $\sqrt{2}.\frac{4}{2\pi}$

1.**2 What of the following sets of quantum numbers is correct for an electron in 3f orbital?**

(a) n = 4, *l* = 3, m = +4, s = $+\frac{1}{2}$ (b) n = 3, *l* = 2, m = –2, s = $+\frac{1}{2}$

(c) n = 4, *l* = 3, m = +1, s = $+\frac{1}{2}$ (d) n = 4, *l* = 4, m = –4, s = $-\frac{1}{2}$

1.3 **The subshell having maximum degeneracy-**

a) s b) p c) d d) f

1.4 **For a s–electron, the orbital angular momentum is:**

(a) $\sqrt{6}(h/2\pi)$ (b) $\sqrt{2}(h/2\pi)$ (c) $(h/2\pi)$ (d) 0

1.5**The number of nodal planes in a s orbital is:**

(a) One (b) Zero (c) Three (d) Four

1.6 **Which of the following sub-orbit has the maximum energy?**

(a) 3s (b) 4s (c) 5p (d) 6s

1.7 **The magnitude of the spin multiplicity of first 3 electronsin $2p^4$is given by:**

(a) 4 (b) 3 (c) 2 (d) 1

1.8 **If m = magnetic quantum number and *l* = azimuthal quantum number, then**

(a) m = *l* + 2 (b) m = $2l^2$ + 1 (c) $1=\frac{m-1}{2}$ (d) *l* = 2m + 1

1.9 **The total number of electrons present in p subshell for Si_{14} is-**

(a) 6 (b) 2(c) 4(d) 0

1.10**The following sets of quantum numbers represent four electrons in an atom.**
(i) n = 4, *l* = 1 (ii) n = 4, *l* = 0 (iii) n = 3, *l* = 2 (iv) n = 3, *l* = 1
In this context, which of the following represents the order of increasing energy?
(a) (iv)< (ii)< (iii)< (i) (b) (ii)< (iv)<(i)< (iii) (c) (i)< (iii)< (ii)< (iv) (d) (iii)< (i)< (iv)< (ii)

1.11 **Which of the following sets of quantum numbers represents the highest energy of an atom?**

(a) n = 4, *l* = 0, m = 0, s = $+\frac{1}{2}$ (b) n = 3, *l* = 0, m = 0, s = $+\frac{1}{2}$

(c) n = 4, *l* = 1, m = +1, s = $+\frac{1}{2}$ (d) n = 3, *l* = 2, m = 1, s = $+\frac{1}{2}$

1.12 **Which of the following statements is correct regarding the probability of finding an electron in a $p_x$orbital?**
(a) It is zero along the x-axis (b) It will be uniform throughout the nucleus.
(c) It is the maximum along the x–axis (d) both (b) and (c) are correct.

1.13 **Which of the following 3d orbitals has zero density in all three exes?**
(a) $3d_{xy}$(b) None of these(c) $3d_z^2$ (d) $3d_{x^2-y^2}$

1.14 **Which of the following statements in correct in the context of $3d_{zx}$ orbital?**
(a) The orbital consists of two positive lobes along the ±z axis and a negative doughnut in the xy plane.
(b) The orbital consists of two negative lobes along the ±z axis and a positive doughnut in the xy plane.
(c) The orbital lies on the zx plane
(d) This orbital consists of one positive lobe along the ±z axis and a negative doughnut in the xy plane.

1.15 **The maximum number of orbitals in a subshell is given by the expression-**
(a) 4*l* – 2 (b) 4*l* + 2 (c) 2*l* + 1 (d) n

PREPARED BY: MR. ARNAB PAUL CHOWDHURY