UNIVERSITY OF JAFFNA, SRILANKA
BACHELOR OF PHARMACY
FIRST YEAR SECOND SEMESTER EXAMINATION – FEBRUARY 2018
PHARMACEUTICAL CHEMISTRY I - PHACH 1273

DATE: 02.03.2018   TIME: 3 Hours.

ANSWER TO ALL QUESTIONS.

1.
    1.1. Briefly explain the followings.
        1.1.1. The experiment that led to the discovery of electron.   (20 Marks)
        1.1.2. Briefly explain the oil drop experiment of Millikan   (20 Marks)
    1.2. List the properties of positive rays.   (10 Marks)
    1.3. Briefly explain three (03) postulates given by Niels Bohr for the atomic
        model of hydrogen.   (20 Marks)
    1.4. Write down the De Broglie equation.   (10 Marks)
    1.5. Write an account on black body radiation.   (20 Marks)

2.
    2.1. Define the Valence Shell Electron Pair Repulsion (VSEPR) model.   (10 Marks)
    2.2. Draw the Lewis structure for the following molecules.
        2.2.1. NF_3 (10 marks)
        2.2.2. SO_3^{2-} (10 marks)
        2.2.3. PCl_5 (10 marks)
    2.3. List five (05) basic VSEPR model, give one example for each, predict the
        bond angle/s of them and state the hybridization of their central atom.   (15marks)
    2.4. Assign AXmEn designation, identify the LP-LP, LP-BP, BP-BP
        interactions, explain the deviation in bond angle from ideal bond angle
        and describe the molecular geometry based on VSEPR model for the
        following chemical species.
        2.4.1. I_3^- (15 Marks)
        2.4.2. SF_4 (15 Marks)
        2.4.3. BrF_3 (15 Marks)

3.
    3.1. Briefly describe the followings
        3.1.1. Orbital quantum numbers   (15 Marks)
        3.1.2. Compton effect   (15 Marks)
        3.1.3. Photo electric effect   (15 Marks)
    3.2. Define the term valence bond theory.   (10 marks)
    3.3. Explain the molecular geometry of NH_3 and SF_6 by using valence bond
        theory.   (15 Marks)

3.4. Define the terms 'Gravimetric analysis' and 'Titrimetric analysis'. (15 Marks)

3.5. Briefly describe the conditions that should be fulfilled by a reaction in order to analyse by titrimetric analysis. (15 Marks)

4.

4.1. Define the 'Molecular orbital'. (10 Marks)

4.2. For O_2^+, O_2, O_2^-, O_2^{2-}

4.2.1. Draw the molecular orbital energy level diagrams. (30 Marks)

4.2.2. Write down the molecular orbital electronic configuration of the above molecules. (10 Marks)

4.2.3. Calculate the bond order of the above molecules. (10 Marks)

4.2.4. Explain the stability of the above species. (10 Marks)

4.2.5. Classify them according to their magnetic property. (10 Marks)

4.3. Sketch the energy level diagram for formed molecular orbitals of a homo-nuclear diatomic molecule of period 2 which has 5 valence electrons on its outer most shell L and large 2S-2P interaction. (20 marks)

5.

5.1. Define the followings

5.1.1. Stereoisomers (10 Marks)

5.1.2. Structural isomers (10Marks)

5.1.3. Optical isomerism (10Marks)

5.1.4. Linkage isomerism (10 Marks)

5.2. Briefly describe the ligands related to co-ordination compounds. (30 Marks)

5.3. Give the IUPAC name of the following compounds.

5.3.1. $[Co(NH_3)_5ONO][FeCl_4]_2$ (05 Marks)

5.3.2. $[Cu(NH_3)_4]Cl_2$ (05 Marks)

5.4. Find out the possible isomerism/s present in the followings.

5.4.1. $[Co(NH_3)_5Br]SO_4$ (05 Marks)

5.4.2. $[Cr(H_2O)_6]Cl_3$. (05 Marks)

5.5. Explain the reason for the higher acidic nature of carboxylic acid than alcohol. (10 Marks)

6.

   6.1.

      6.1.1. Define the term 'impurities' and list the various sources of impurities in pharmaceutical substances and give one example for each sources.   (45 Marks)

   6.2.

      6.2.1. Briefly explain the principles employed in the limit test for sulphate.   (15 Marks)

      6.2.2. List the modifications, depending upon the nature of the substance that have to be adopted for the preparation of the solution for performing the limit test for chloride.   (15 Marks)

   6.3.

      6.3.1. Define "resonance hybrid" and "resonance contributors" with one example.   (10Marks)

      6.3.2. Draw the resonance structures for aniline and $(NO_3)^-$ (15 Marks)