UNIVERSITY OF JAFFNA, SRI LANKA
BACHELOR OF PHARMACY
FIRST YEAR SECOND SEMESTER EXAMINATION – JANUARY, 2016
PHACH 1273   PHARMACEUTICAL CHEMISTRY I

Date: 05.02.2016.   Time: 3 Hours

ANSWER ALL SIX QUESTIONS.

1.

1.1   Write short note on 'Rutherford experiment'.   (10 Marks)
1.2   Define the followings:
    1.2.1   Compton effect   (10 Marks)
    1.2.2   Heisenberg uncertainty principle   (10 Marks)
    1.2.3   Black body Radiation   (10 Marks)

1.3   1.3.1   Define Photoelectric effect   (10 Marks)
    1.3.2   The work function for lithium is 4.6×10^{-19}. Calculate the
lowest frequency of light that will cause photoelectric emission.
What is the maximum energy of the electrons emitted when light
of 7.3×10^{14} Hz is used?   (20 Marks)
    1.3.3   Write down de Broglie's equation.   (10 Marks)
    1.3.4   Find the de Broglie wavelength for an electron moving at
the speed of 6.0×10^{6} m/s (mass of an electron is 9.1×10^{-31} kg).   (20 Marks)

2.

2.1   Define followings
    2.1.1   Primary Valance   (05 Marks)
    2.1.2   Co-ordination number   (05 Marks)

2.2   2.2.1   Define Ligand   (10 Marks)
    2.2.2   Classify ligands with suitable example   (20 Marks)
2.3   Diagrammatically illustrate the isomerism of
    2.3.1 $[Cu(NH_3)_4][PtCl_4]$ (10 Marks)
    2.3.2 $[Co(NH_3)_4(NO_2)(SO_4)]$ (30 Marks)
    2.3.3 $[Ni(en)_3]^{2+}$ (10 Marks)
2.4   List the pharmaceutical applications of Co-ordination
compounds.   (10 Marks)

3.

3.1   3.1.1   Define Gravimetry.   (10 Marks)
    3.1.2   Outline the advantages of gravimetric analysis   (20 Marks)
3.2   For PH_5 and XeF_4
    3.2.1   Draw the Lewis electron structure of the molecules.   (10 Marks)
    3.2.2   Assign an AXmEn designation; then identify the LP–LP,
LP–BP, or BP–BP interactions and predict deviations in bond
angles.   (20 Marks)
    3.2.3   Describe the molecular geometry.   (10 Marks)

3.2   Explain the molecular geometry of CH_4 and BeH_2 by using
valence bond theory.   (30 Marks)

4. 4.1 Define 'Molecular orbital theory'.   (10 Marks)
    4.2 For O_2, NO and N_2.

        4.2.1 Draw molecular orbital energy level diagrams.   (30 Marks)
        4.2.2 What is main difference between N_2 and O_2 diagram,
               outline the reasons.   (10 Marks)
        4.2.3 What is the different between N_2 and NO molecular
               orbital diagram?   (10 Marks)
        4.2.4 Write down the molecular orbital electronic configuration
               of the above molecules.   (10 Marks)
        4.2.5 Find out the bond order of the above molecules.   (10 Marks)
        4.2.6 Explain the stability of the above molecules.   (20 Marks)

5.
    5.1 Briefly describe the following terms with suitable examples.
        5.1.1 Resonance hybrid   (05 Marks)
        5.1.2 Resonance contributor   (05 Marks)
    5.2 Draw the resonance structures for the following benzyl radical.

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        Ph-CH_2 (15 Marks)
    5.3 Indicate whether the following atoms or ions are paramagnetic
         or diamagnetic.
        5.3.1 Chlorine atoms   (05 Marks)
        5.3.2 Zinc atoms   (05 Marks)
        5.3.3 Fe^{2+} ions   (05 Marks)
        5.3.4 Br^- ions   (05 Marks)
    5.4 5.4.1 List the motions which contribute the origin of magnetic   (10 Marks)
         moment of materials.
         5.4.2 Briefly describe the determining factors of the magnetic   (45 Marks)
         property of the materials.

6.
    6.1 Briefly explain the sources of impurities of the pharmaceutical   (50 Marks)
         substances?
    6.2 Briefly describe any standard methods for the limit tests of the
         following chemicals.
        6.2.1 Limit test for chloride   (15 Marks)
        6.2.2 Limit test for sulphate   (15 Marks)
    6.3 List any five methods used for the preparation of Oxygen.   (10 Marks)
    6.4 List one main pharmaceutical usage of boran, nitrogen, chlorine
         and iodine.   (10 Marks)

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