No. of Printed Pages : 5

BAS-002

B.TECH. IN AEROSPACE ENGINEERING (BTAE)

01541

Term-End Examination

June, 2010

BAS-002 : APPLIED CHEMISTRY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **seven** questions in all. Question number **1** is **compulsory**. Use of calculator is allowed.*

1. Define ***any five*** of the following : **2x5=10**

(a) Solvent extraction.

(b) Electromotive force.

(c) Condensation polymers.

(d) Alkali metals.

(e) Multiple bonding.

(f) Galvanic corrosion.

(g) Chiral centre.

2. Answer ***any two*** of the following : **5x2=10**

(a) If the electron in a hydrogen atom goes from n = 10 state to ground state, a photon will be emitted. Calculate the wavelength of the photon.

(b) For the cell, $Ag|Ag^{+}||Cu^{+2}|Cu$ find out the emf of the cell and state whether or not copper will displace silver from the solution containing silver ions.

(c) Sea water contains 16,600 kg of chlorine (Cl^{-}), 9,200 kg of sodium and 1180 kg of magnesium per million litres of sea water. What is the molarity of each and what concentration of charge is unaccounted for ? The unaccounted charge is balanced by other anions. (at wt. : Cl = 35.5, Na = 23.0, Mg = 24.3).

3. For the galvanic cell, **10**

$$Cd|Cd^{2+}_{(0.05M)}||C1^{-}{}_{(0.1M)}\ |Cl_{2(1\ atm)}:|Pt$$

(a) Identify :

(i) the anode

(ii) the cathode

(iii) the positive electrode

(iv) the negative electrode

(b) Write down the electrode reactions.

(c) Write down the cell reactions.

(d) Write the Nernst equation for the cell.

(e) Calculate the emf at 298 K, if $E° = 1.76$ volts.

4. (a) What are the various sources available for the production of SO_2 ? Give equations for each of these. **2x5=10**

(b) Mention an important use for each of the following :

(i) Argon

(ii) Krypton

(iii) Carbon dioxide

(iv) Nitrogen

(v) Sulphuric acid

5. Give reasons for ***any five*** of the following : **2x5=10**

(a) Nitric acid is used to prepare fertilizers.

(b) Solid CO_2 is called dry - ice.

(c) Related with magnetic and spectroscopic properties the spin only formula can not be used in case of lanthanides.

(d) When Ni and Zn form a galvanic couple, zinc is likely to corrode.

(e) Magnesium has variable oxidation states.

(f) CH_4 shows sp^3 hybridization while C_2H_4 shows sp^2 hybridization.

6. (a) Name the following complexes of transition metal ions : 5

(i) $[Co\ (NH_3)_3\ Cl_3]$

(ii) $K_2\ [CuCl_4]$

(iii) $[Pt\ (NH_3)_2\ (NO_2)_2]$

(iv) $[Co\ (NH_3)_3\ (NO_2)_3]$

(v) $[Pt\ Cl_6]^{2-}$

(b) State the geometrics associated with the following schemes of hybridization for transition metal ion complexes : 5

(i) $sp^3\ d^2$

(ii) sp^3

(iii) $d^2\ sp^3$

(iv) $d\ sp^2$

(v) $d\ sp^3$

7. (a) Write the significance of silicone polymers and give the properties of these polymers which are responsible for their wide use. 5

(b) What are geometrical isomers ? Write the structures of the isomers of 3 - methyl - 2 - pentene. 5

8. (a) What is meant by addition polymerisation ? Give an example. Describe in brief the mechanism of addition polymerisation. 5

(b) What are the monomeric units of the natural rubber ? Describe in brief the dispersity of a polymer. 5

9. (a) Describe the solvey process for the preparation of soda ash. (Na_2CO_3). 5

(b) What are fertilizers ? Give the equations for the manufacture of superphosphate. 5