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BAS-002

B.Tech. AEROSPACE ENGINEERING (BTAE)

Term-End Examination

00126

June, 2015

BAS-002 : APPLIED CHEMISTRY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Define any ***five*** of the following : *5×2=10*

(a) Covalent radius

(b) Hybridization

(c) Metallic bond

(d) Angular momentum

(e) Octane number

(f) Le Chatelier principle

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

(a) Calculate the Bohr's radius (a_0) of the first hydrogen orbit.

(b) What is hydrogen bonding ? Differentiate between inter and intra-molecular hydrogen bonding.

(c) Explain Heisenberg's uncertainty principle.

3. (a) Write short notes on the following : *5*

(i) Aufbau principle

(ii) Polyelectron atoms

(b) Describe the experiments which show that an electron behaves both as a particle and a wave. *5*

4. (a) (i) Write the reactions involved in the formation of poly vinyl chloride.

(ii) Differentiate between thermosetting plastics and thermoplastics. *5*

(b) Define ionization energy (IE). How does ionization energy vary across a period ? *5*

5. (a) Write the IUPAC names of the following complexes : *5*

(i) $[Ag(NH_3)_2]Cl$

(ii) $K_4[Fe(CN)_6]$

(iii) $K[BF_4]$

(iv) $Na_2[SiF_6]$

(v) $[PtCl_4(NH_3)_2]$

(b) Describe the lead chamber process for the manufacture of sulphuric acid. *5*

6. (a) Define a reversible reaction. Give any two examples of reversible reactions. Write the relationship between K_p and K_c. 5

(b) At 500°C, the reaction between N_2 and H_2 to form ammonia has $K_c = 6{\cdot}0 \times 10^{-2}$. What is the numerical value of K_p for the reaction ? 5

7. (a) Find the degree of dissociation of HF in 1 M aqueous solution. The value of K for the ionic equilibrium of $HF \rightleftharpoons H^+ + F^-$ is $7{\cdot}2 \times 10^{-4}$. 5

(b) Define lanthanide contraction. How does lanthanide contraction affect the atomic radii of lanthanides ? 5