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BAS-002

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B.TECH. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

June, 2011

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 : **5x2=10**

(a) Collision radius

(b) Screening constant

(c) Electron affinity

(d) Bond energy

(e) Lanthanide series

(f) Ionization potential

(g) Hydro halogenation

2. (a) Write reaction for the formation of a deutron and a positron. **5**

(b) Calculate the energy released (Q) from the fusion of $_3Li^6$ and $_1D^2$ by the reaction in terms of amu and Mev (the isotopic masses are - $_1D^2 = 2.01474$ amu, $_3Li^6 = 6.01702$ amu and $_2He^4 = 4.00387$ amu) **5**

3. Answer *any two* of the following : **2x5=10**

(a) Binding energy and importance of binding energy curve in the release of nuclear energy.

(b) Angular probability distribution of orbital

(c) sp^3 hybridisation and shape of NH_3 molecule

4. (a) At 90°C, the vapour density of nitrogen tetrachloride is 24.8 for the reaction **5**

$$N_2O_4 \rightleftharpoons NO_2 + NO_2$$

(i) State if the dissociation reaction is balanced.

(ii) Calculate the percentage dissociation using the following expression.

$$x = \frac{P_1 - P_2}{P_2}$$

(b) (i) Define electrode potential. Name the scientist and the theory that explains electrode potential generation. **5**

(ii) Write the factors which affect magnitude of electrode potential.

5. Give reasons for *any five* of the following : **5x2=10**

(a) The articles made of iron are coated with Ag, Au metals.

(b) The saturated solution of KNO_3 is used to make salt bridge.

(c) Finely divided Fe mixed with Mo is used for combination of N_2 and H_2 in Haber's Process.

(d) The electron density on O-atom is higher than on S - atom.

(e) Conc. H_2SO_4 shows dehydration property.

(f) $AgNO_3$ solution is stored in covered dark bottles.

6. (a) Differentiate between addition polymerisation and condensation polymerisation. Give industrial uses of isoprene and ethene. 5

(b) Define polymer. Give the chemical formula of monomer of teflon. 5

7. (a) Give the variation in the size of cations compared to their respective parent atoms citing the example of Na, K and F. 5

(b) Differentiate between Van der Waals radii and Covalent radii. Give one method for the determination of ionic radii. 5

8. (a) Write the structural formulae and IUPAC names of acetylene and acetaldehyde. 5

(b) What are the special names used for naming 1, 2 ; 1, 3 ; and 1, 4 disubstituted derivatives of benzene ? 5

9. (a) Give Haber's process for the manufacture of ammonia. 5

(b) How benzene is obtained from coal gas ? Also give the reaction (s) involved. 5