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BAS-002

**B. TECH. IN AEROSPACE
ENGINEERING (BTAE)**

Term-End Examination

June, 2019

BAS-002 : APPLIED CHEMISTRY

Time : 3 Hours

Maximum Marks : 70

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

1. Explain the following giving reasons : 2 each
 - (a) Usually the first ionization energy of elements increases with the atomic number of elements in a period of the periodic table.
 - (b) Fluorine has lower electron affinity than chlorine.

(A-8) P. T. O.

- (c) Ionization energy decrease from Be to B and Mg to Al.
- (d) Diamond is an insulator while graphite conducts electricity.
- (e) All gases are mono-atomic.
2. (a) What do you understand by isomers ?
Write the structures and IUPAC names of the isomers of C_5H_{10} . 5
- (b) What is the difference between a Galvanic cell and a Concentration cell ? 5
3. (a) Explain in brief any *three* of the following terms with illustrations : 6
- (i) Structural isomerism
 - (ii) Stereoisomerism
 - (iii) Position isomerism
 - (iv) Tautomerism
- (b) Write down the equations for the manufacture of HNO_3 from NH_3 by Ostwald's process. 4

4. (a) Explain how methane is used in the synthesis of ammonia and methanol. 6
- (b) (i) What is meant by cross linking of the chains? 2
- (ii) Why are silicon polymers important macromolecules? 2
5. (a) Choose the correct alternatives from the ones given at the end of each statement : 5
- (i) The size of the atom in Thompson's model is the atomic size in Rutherford's model.
- (much greater than; no different from; much less than)
- (ii) In the ground state of electrons are in stable equilibrium, while in electrons always experience a net force.
- (Thompson's model, Rutherford's model)

(iii) A classical atom based on is doomed to collapse.

(Thompson's model, Rutherford's model)

(iv) An atom has a nearly continuous mass distribution in but has a highly non-uniform mass distribution in

(Thompson's model, Rutherford's model)

(v) The positively charged part of the atom possesses most of the mass of the atom in

(Rutherford's model; both the models)

(b) The ground state energy of hydrogen atom is -13.6 eV. What are the kinetic energy and potential energy of the electron in this state ?

6. (a) Write the electronic configuration of the following elements (any *five*): 5

(i) Al (13)

(ii) Cl (17)

(iii) Fe (26)

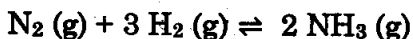
(iv) Ba (56)

(v) Pt (78)

(vi) Hg (80)

(b) What are fuel cells ? How are these better than the conventional electrochemical cells ? 5

7. The reaction for the preparation of ammonia by Haber's process is given as : 5, 5



(i) Write the expressions for K_p and K_c for the above equilibrium reaction.

- (ii) Establish a relationship between K_p and K_c for the same.
8. (a) Differentiate between primary cells and secondary cells. 5
- (b) Define the following : 5
- (i) Solvent extraction
 - (ii) Condensation polymers
 - (iii) Multiple bonding
 - (iv) Galvanic corrosion
 - (v) Chiral centre
9. (a) What are the various sources available for the production of SO_2 ? Give equations for each of these. 5
- (b) A photon of wavelength 3310 \AA falls on a photocathode and an electron of energy $3 \times 10^{-19} \text{ J}$ is ejected. If the wavelength of the incident photon is changed to 5000 \AA ,

[7]

BAS-002

the energy of the ejected electron is 7.91×10^{-20} J. Calculate the value of Planck's constant and threshold wavelength of the photon. 5