P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination

May 2019

SESH1220 Chemistry

22.05.2019, Wednesday **Time: 12:30 p.m. To 3:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 **Multiple Choice Questions: (Any five)** **[05]**

(i) Which one of the following molecules contains no π bond?

(i) CO_2 (ii) NO_2 (iii) SO_2 (iv) H_2O

(ii) When diluting acid always add

(i) water to acid (ii) acid to water (iii) can be both ways (iv) acid cannot be diluted

(iii) Covalent bonds can be break by

(i) homolytic fission (ii) heterolytic fission (iii) hemolytic fusion (iv) both A and B

(iv) Number of bonding pairs of electrons in water H_2O is

(i) 1 (ii) 2 (iii) 3 (iv) 4

(v) Which of these does not come under organic reaction?

(i) Elimination (ii) Rearrangement (iii) Addition (iv) Hydrogen bonding

(vi) An ionic bond is formed between

(i) one metal atom and one non metal atom (ii) two metal atoms (iii) two non-metal atoms (iv) one metal atom and one metalloid atom

(vii) Which reagent is act as a good nucleophilic agent?

(i) NH_3 (ii) HBr (iii) Br_2 (iv) BH_3

Q - 2 (a) Explain condition for covalent bond formation with examples. **[05]**

Q - 2 (b) Discuss the characteristics of ionic compounds **[05]**

OR

Q - 2 (a) Explain in details the hybridisation and their types with examples each. **[05]**

Q - 2 (b) Explain electron sea model and physical characteristics of metals on it. **[05]**

Q - 3 (a) Discuss Arrhenius ionic theory. **[05]**

Q - 3 (b) Explain Zeroth law of thermodynamics and First law of thermodynamics and their Limitations **[05]**

OR

Q - 3 (a) Discuss De-bye Huckel theory of strong electrolyte. **[05]**

Q - 3 (b) Derive relation between C_p and C_v **[05]**

Q - 4 **Attempt any one.** **[05]**

(i) Explain Reversible and isothermal expansion of an ideal gas

(ii) Explain second law of thermodynamics and also state its limitations.

SECTION – II

Q - 1 **Multiple Choice Questions. (Any Five)** **[05]**

(i) Which of the following methods can be used to measure carbon removal during wastewater treatment?

(i) Total organic carbon (TOC) test | (ii) Chemical oxygen demand (COD) test | (iii) Biochemical oxygen demand (BOD) test | (iv) All of the above

(ii) Temporary hardness in water is due to

(i) Magnesium carbonate | (ii) Calcium sulphate | (iii) Magnesium sulphate | (iv) Magnesium chloride

(iii) The coagulant, which is generally used for treatment of water is

(i) Alum | (ii) Ferric chloride | (iii) Ferric sulphate | (iv) Chlorinated copperas

(iv) The random zig-zag motion of colloidal particles in a dispersion medium is known as

(i) Dialysis | (ii) Tyndall effect | (iii) Brownian motion | (iv) Electrophoresis

(v) Temporary hardness of water can be removed by

(i) Boiling | (ii) Filtration | (iii) Coagulation | (iv) None of the above

(vi) The dispersion medium for the formation of colloids forms a non-continuous phase.

(i) True | (ii) False

(vii) An _____ is a sol with the continuous phase a gas. Fog is an _____ of water droplets.

(i) Aerosol | (ii) Emulsion | (iii) Agglomerate | (iv) Electrophoresis

Q - 2 (a) What do you mean by boiler corrosion? **[05]**

Q - 2 (b) Differentiate between scale & sludge. Which is more disadvantageous in boilers? **[05]**

OR

Q - 2 (a) What is Hardness of Water? State its types and explain cold lime soda process for water treatment in detail. **[05]**

Q - 2 (b) Explain zeolite process for treatment of water in detail. **[05]**

Q - 3 (a) Discuss Heat treatment of steel and Alloy steels. **[05]**

Q - 3 (b) Explain in detail various methods for internal treatment of boiler water. **[05]**

OR

Q - 3 (a) State different types of colloidal solution. **[05]**

Q - 3 (b) Describe characteristics of colloidal state. **[05]**

Q - 4 **Attempt any one.** **[05]**

(i) Describe the purification of water by reverse osmosis method.

(ii) Explain purification of colloidal solutions via dialysis methods

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