P. P. SAVANI UNIVERSITY

First Semester of B.Sc. Examination

Feb. -2022

SSES1020 – Chemistry - I

12.02.2022, Saturday   Time: 12:00 p.m. to 02:30 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 (Total Marks - 30)

Q.1	**Short Questions**		[10]
1.1	**Objectives**		[05]

1.1a The charge to mass ratio (e/m) of positive particles _____
- A   varies with the nature of gas in discharge tube
- B   is constant
- C   is independent of the gas in discharge tube
- D   none of the above

1.1b The energy of the photon is given by the relation _____
- A $E = \frac{h\upsilon}{\lambda}$
- B $E = \frac{hc}{\upsilon}$
- C $E = \frac{hc}{\lambda}$
- D $E = \frac{hc}{\lambda}$

1.1c When a beam of light of sufficiently high frequency is allowed to strike a metal in vacuum, electrons are ejected from the metal surface. This phenomenon is called _____
- A   Zeeman effect
- B   Black body radiation
- C   Stark effect
- D   Photoelectric effect

1.1d Lyman series is obtained when the electron from higher energy levels return to _____
- A   1st orbit
- B   2nd orbit
- C   3rd orbit
- D   4th orbit

1.1e The maximum number of electrons that can be accommodated in an orbit is _____
- A $2n$
- B $2n + 1$
- C n^2
- D $2n^2$

1.1f The species CO, CN⁻ and N_2 are_____

    A having co-ordinate bond

    B isoelectronic

    C having polar bonds

    D having low bond energies

1.1g An example of electron deficient compound among BF_3, CF_3, PF_3 and SF_6 is

    _____

    A BF_3

    B CF_3

    C PF_3

    D SF_6

1.1h In which of the following, the central atom is surrounded by four electron pairs ____

    A H_2O

    B NH_3

    C CH_4

    D All

1.1i Electromagnetic radiations with minimum wavelength is

    A ultraviolet

    B X-rays

    C infrared

    D radiowaves

1.1j Balmer series in the spectrum of hydrogen atom lies in

    A ultraviolet region

    B visible region

    C infrared region

    D none of these

1.2 **Answer the Following: (MCQ/Short Question/Fill in the Blanks)** [05]

1.2a Define: Covalent bond

1.2b Due to which bond methanol is soluble in water.

1.2c why metals are good conductor of electricity?

1.2d Define Compton effect.

1.2e Wave number is measured in which unite.

Q.2 **Short Notes (Attempt any two)** [06]

A Types of hydrogen bonding

B Photoelectric effect

C Postulates of Bohr theory

Q.3 **Explain in detail (Attempt any two)** [14]

A Describe Rutherford's Atomic Model.

B Discuss VSEPR theory in detail.

C Explain electron sea model in detail.

Q.1 **Short Questions** [10]

1.1 **Objectives** [05]

1.1a All nucleophiles are

    A   All nucleophiles are

    B   Bronsted bases

    C   Lewis acids

    D   Lewis bases

1.1b Which of the following is not a buffer solution?

    A $NH_4Cl + NH_4OH$

    B $CH_3COONa + CH_3COOH$

    C $NaOH + HCl$

    D $HCOONa + HCOOH$

1.1c A strong base has ____conjugate acid and a strong acid has a ____conjugate base

    A   strong, strong

    B   weak, strong

    C   strong, weak

    D   weak, weak

1.1d In the following hypothetical reaction $HA + B^- \rightarrow HB + A^-$. The conjugate base of the acid HA is

    A B^-

    B   HA

    C A^-

    D   none of these

1.1e The human kidneys purify the blood by _____ through natural membranes

    A   osmosis

    B   diffusion

    C   dialysis

    D   emulsification

1.1f The Henderson equation for an acidic buffer is

    A $pH = pKa + \log \frac{salt}{acid}$

    B $pOH = pKa + \log \frac{salt}{acid}$

    C $pH = pKa - \log \frac{salt}{acid}$

    D $pH = pKa - \log \frac{[acid]2}{acid}$

1.1g In lyophobic sols, the dispersed phase has no _____ for the medium or solvent

    A   repulsion

    B   attraction

    C   solvation

    D   hydration

1.1h The continuous rapid zig-zag movement executed by a colloidal particle in the dispersion medium is called

    A   Tyndall effect

      B   Brownian movement

      C   electrophoresis

      D   peptization

1.1i   Which is correct about pH?

      A $pH = -\log [H^+]$

      B $pH = \log \frac{1}{H+}$

      C $pH = 10^{-pH}$

      D   all of these

1.1j   An emulsion is a colloidal solution of a _____ dispersed in another liquid

      A   solid

      B   liquid

      C   gas

      D   medium

1.2   **Answer the Following: (MCQ/Short Question/Fill in the Blanks)**   [05]

1.2a Define the strength of acid.

1.2b The pH of a solution decreases from 1 to 2. The concentration of H^+ ions _____ (increases/decreases).

1.2c What is polyprotic base. Give example.

1.2d What are Micelles? Give examples.

1.2e What is meant by peptization? Give a suitable example

Q.2   **Short Notes (Attempt any two)**   [06]

A   A buffer solution contains 0.015 mole of ammonium hydroxide and 0.025 mole of ammonium chloride. Calculate the pH value of the solution. Dissociation constant of NH_4OH at the room temperature is 1.80×10^{-5}.

B   What do you understand by the number average and the weight average molecular weight of macromolecules?

C   What are buffer solutions? Derive Henderson's equation.

Q.3   **Explain in detail (Attempt any two)**   [14]

A   Explain with an example why pH of a buffer solution does not change significantly on small addition of acids or bases.

B   Describe two method for the preparation of colloidal solutions.

C   Write a short note on

      (1) Tyndall effect and

      (2) Brownian movement