

This question paper contains 3 printed pages]

W—46—2018

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2018

(CBCS/CGPA Pattern)

CHEMISTRY

Paper IV

(Physical and Inorganic Chemistry)

(MCQ+Theory)

(Saturday, 13-10-2018)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) All questions carry equal marks.

(iii) Use OMR sheet for question No. 1.

(iv) Calculator is allowed.

(v) Only one answer sheet should be used for Section A and B.

(MCQ)

1. Select the correct answer for each of the following multiple choice questions.

(i) Rutherford Scattering experiment is related to the size of :

(A) Atoms

(B) Electron

(C) Neutron

(D) Nucleus

(ii) Energy of electron in third Bohr's orbit of hydrogen atom is :

(A) -1.5 eV

(B) -3.4 eV

(C) -13.6 eV

(D) -1.36 V

(iii) Which of the following is *not* a colloid ?

(A) Smoke

(B) Milk

(C) Chlorophyll

(D) Ruby glass

P.T.O.

- (iv) The blue colour of water in the Sea is due to :
- (A) absorption of blue colour
 - (B) reflection of blue sky by sea water
 - (C) refraction of blue light by impurities in sea water
 - (D) scattering of blue light by water molecules
- (v) Efficiency of a catalyst depends on its :
- (A) Solubility
 - (B) Particle size
 - (C) Molecular weight
 - (D) None of these
- (vi) The iron catalyst used in the synthesis of ammonia is poisoned by :
- (A) H_2S
 - (B) Al_2O_3
 - (C) H_2O
 - (D) CO_2
- (vii) Insects can walk on the surface of water due to
- (A) Optical activity
 - (B) Viscosity
 - (C) Surface tension
 - (D) Refractivity
- (viii) The force of attraction between M^+ ions and valence electrons is in all directions.
- (A) Uniform
 - (B) Non-uniform
 - (C) Less
 - (D) High
- (ix) Dissolution of NaCl in water is due to
- (A) dipole - dipole interaction
 - (B) dipole - induced dipole interaction
 - (C) ion - dipole interaction
 - (D) Instantaneous dipole - induced dipole interaction
- (x) The hybridisation of Ni^{2+} ion in $[\text{Ni}(\text{CN})_4]^{2-}$ ion is
- (A) Sp^3
 - (B) dSp^2
 - (C) Sp^3d
 - (D) Sp^3d^2

(Theory)**Section A****(Physical Chemistry)**

2. Solve any *two* of the following :
- (a) Derive an expression for radius of n th Bohr's Orbit of Hydrogen atom.
 - (b) What is Parachor ? Give the relation between Parachor and Surface tension.
 - (c) Discuss the electrical properties of sols.
 - (d) Explain Homogeneous and Heterogeneous catalysis with examples.
3. Solve any *two* of the following :
- (a) Explain : (i) Pauli's exclusion principle
(ii) Aufbau principle.
 - (b) Discuss the general applications of colloids.
 - (c) Explain promoters and catalytic poisoning with suitable example.
 - (d) (i) Calculate the radius of third Bohr's orbit of hydrogen atom.
(ii) In the determination of surface tension by drop number method, a liquid gives 60 drops and water gives 35 drops for the same volume. The densities of liquid and water are 0.86 and 0.99 g.cm⁻³ respectively. If the surface tension of water is 72 dyne.cm⁻¹, calculate surface tension of liquid.

Section B**(Inorganic Chemistry)**

4. Solve any *two* of the following :
- (a) What is van der Waals bonding ? Discuss its types in detail.
 - (b) Explain Fajan's rule of polarization.
 - (c) (i) Give the unique properties of water based on hydrogen bonding.
(ii) Explain the geometry of H₂O molecule on the basis of VSEPR theory.
 - (d) Discuss sp³d² hybridization with example.