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Y—53—2019

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2019

(CBCS/CGPA Pattern)

CHEMISTRY

Paper IV

(Physical and Inorganic Chemistry)

(MCQ & Theory)

(Thursday, 17-10-2019)

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 each of the following Multiple Choice Questions :

- (i) The idea of stationary orbit was first given by :
 - (a) Rutherford
 - (b) J.J. Thomson
 - (c) Niels Bohr
 - (d) Max Planck
- (ii) The maximum number of electrons in orbit is given by :
 - (a) $2n^2$
 - (b) n^2
 - (c) $2(2l + 1)$
 - (d) $2l - 1$

P.T.O.

- (iii) Bredig's Arc method is used for preparing hydrosols of metal :
- (a) Ag (b) Au
(c) Pt (d) All of these
- (iv) The precipitation power of Al^{+3} , Na^{+} , Ba^{+2} is in the order :
- (a) $\text{Na}^{+} > \text{Ba}^{+2} > \text{Al}^{+3}$ (b) $\text{Ba}^{+2} > \text{Na}^{+} > \text{Al}^{+3}$
(c) $\text{Al}^{+3} > \text{Na}^{+} > \text{Ba}^{+2}$ (d) $\text{Al}^{+3} > \text{Ba}^{+2} > \text{Na}^{+}$
- (v) The enzyme which can catalyse the conversion of Glucose to Ethanol is :
- (a) Maltase (b) Invertase
(c) Zymase (d) Catalyse
- (vi) A catalyst will affect the rate of the forward reaction by changing the :
- (a) Activation energy
(b) Heat of reaction
(c) Heat of formation
(d) Potential energy of the products
- (vii) Surface tension is measured in :
- (a) dyne cm (b) dyne cm^{-1}
(c) dyne $^{-1}$ cm (d) dyne $^{-1}$ cm^{-1}
- (viii) The hydrogen bond is strongest in :
- (a) O—H.....S— (b) S—H.....O—
(c) F—H.....F— (d) F—H.....O—
- (ix) PCl_5 molecule has type of hybridization.
- (a) sp^3 (b) sp^3d^2
(c) sp^3d^3 (d) sp^3d

- (x) O_2 molecule is diamagnetic according to theory.
- (a) VBT (b) VSEPR
- (c) MOT (d) None of these

Theory

Section-A : (Physical Chemistry)

2. Solve any *two* of the following :

- (a) State the postulates of Bohr's atomic theory. Give its demerits.
- (b) What is Viscosity ? How will you determine the viscosity of liquid by Ostwald's viscometer method ?
- (c) Define colloidal system. Give its classification with suitable example.
- (d) Write short notes on :
- (i) Catalytic poisoning
- (ii) Promoters.

3. Solve any *two* of the following :

- (a) Explain :
- (i) Hund's rule
- (ii) Pauli's exclusion principle.
- (b) What is emulsion ? Explain the types of emulsion.
- (c) Describe the dispersion method for the preparation of solutions.
- (d) (i) Calculate the energy of electron in second Bohr's orbit of H-atom.
- (ii) In the determination of surface tension of liquid by drop number method, a liquid gives 59 drops while water gives 28 drops for the same volume. The densities of liquid and water are 0.996 gm/cm^3 and 0.800 gm/cm^3 respectively. Find the surface tension of the liquid if that of water is 72.0 dynes/cm .

P.T.O.

Section-B : (Inorganic Chemistry)

4. Solve any *two* of the following :

- (a) What is 'Free Electron Theory' of Metallic Bonding ? Explain the effects of metallic bonding on metallic properties.
- (b) How the percentage ionic character in a covalent bond can be explained from the dipole moment ? Explain in detail.
- (c) (i) How are 'Sigma and Pi-bond' formed ? Explain with the help of V.B.T.
- (ii) The shape of H_2O molecule is angular. Justify with the help of V.S.E.P.R. theory.
- (d) (i) Explain molecular orbital diagram for Ne_2 . Calculate its bond order.
- (ii) O_2 molecule is not diamagnetic. Explain with the help of M.O.T.