

This question paper contains 5 printed pages]

AO—46—2018

FACULTY OF SCIENCE

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

MARCH/APRIL, 2018

(CBCS/CGPA Pattern)

CHEMISTRY

Paper IX

(Physical and Inorganic Chemistry)

(MCQ & Theory)

(Thursday, 22-3-2018)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt All questions.

(ii) All questions carry equal marks.

(iii) Use of logarithmic table and calculator is allowed.

(iv) Use separate answer-sheet for MCQ Q. No. 1.

(v) Use black point pen to darken the circle of correct choice in OMR sheet.

(vi) Use only one answer-book for both Sections A and B.

MCQ

1. Select the *correct* answer for each of the following Multiple Choice Questions : 10

- (i) Petrol on water in rainy days exhibit the phenomenon of :
- | | |
|---------------------|--------------------------|
| (a) Fluorescence | (b) Delayed fluorescence |
| (c) Phosphorescence | (d) Both (a) and (b) |

P.T.O.

- (ii) Kohlrausch's law is used to determine :
- (a) Absolute ionic mobilities
 - (b) λ_{∞} for weak electrolytes
 - (c) Solubility of sparingly soluble salts
 - (d) All of the above
- (iii) According to Debye and Huckel, strong electrolytes in solution gets completely broken into :
- (a) Electrons
 - (b) Charged particles that conduct electricity
 - (c) Light and heat
 - (d) Salt and water that more with current
- (iv) If the rate expression for a chemical reaction is $\text{Rate} = K[A][B]^n$, then the order of reaction is :
- (a) 1
 - (b) n
 - (c) K is independent of T
 - (d) $1 + n$
- (v) The half life of a first order reaction is :
- (a) Directly proportional to initial concentration
 - (b) Inversely proportional to initial concentration
 - (c) Independent of initial concentration
 - (d) None of the above
- (vi) In some photochemical reactions low quantum field is obtained. It is due to :
- (a) Occurrence of reverse primary reaction
 - (b) Recombination of dissociated fragments
 - (c) Deactivation of reacting molecules
 - (d) All of the above

(vii) The specific conductance of a solution is given by :

(a) $K = \frac{1}{R} \times \frac{A}{l}$

(b) $K = \frac{1}{R} \times \frac{l}{A}$

(c) $K = R \times \frac{l}{A}$

(d) $K = R \times \frac{A}{l}$

(viii) The IF_5 has geometry.

(a) Square planar

(b) Linear

(c) Octahedral

(d) None of these

(ix) The No. of lone pairs and bond pairs present in BrF_5 molecules are :

(a) 0 and 3

(b) 1 and 3

(c) 5 and 1

(d) 1 and 5

(x) CaC_2 is an example of :

(a) Covalent carbide

(b) Ionic carbide

(c) Metallic carbide

(d) None of these

Theory

Section A

(Physical Chemistry)

2. Solve any *two* of the following :

2×5=10

(i) Explain the half-life and graphical method for the determination of order of a reaction.

(ii) Explain the Arrhenius theory of electrolytic dissociation. Give its limitations.

P.T.O.

- (iii) (a) Differentiate between photochemical and thermochemical reactions. 2
- (b) A system absorbs 3×10^{16} quanta of light per second. On irradiation for 20 minutes, 3×10^{-3} moles of reactant was found to have reacted. Calculate the quantum yield of the reaction. 3
- (iv) Derive the equation for rate constant of first order reaction. Show that the time taken for the completion of same fraction of change is independent of initial concentration.
3. Answer any *two* of the following : $2 \times 5 = 10$
- (i) State and explain the Kohlrausch's law.
- The transport number of H^+ ion in HCl and CH_3COO^- ion in CH_3COONa are 0.81 and 0.47 respectively. The equivalent conductances at infinite dilution of HCl and CH_3COONa are $426 \text{ ohm}^{-1} \text{ cm}^2 \text{ equt}^{-1}$ and $91 \text{ ohm}^{-1} \text{ cm}^2 \text{ equt}^{-1}$. Calculate the equivalent conductance of acetic acid at infinite dilution.
- (ii) What is quantum yield ? Give the experimental determination of quantum yield.
- (iii) The resistance of 0.5 N solution of an electrolyte in a cell was found to be 50 ohms. The electrodes of the cells are 2 cm apart having cross-sectional area of 4 cm^2 . Find the equivalent conductivity of solution.
- (iv) (a) Derive the rate constant expression for a zero order reaction. 3
- (b) Calculate the energy of a photon in Joules associated with wavelength of 3600 \AA . 2

Section B**(Inorganic Chemistry)**

4. Solve any *two* of the following : 2×5=10
- (a) What are Zeolites ? Give their classification.
- (b) What are Interhalogen compounds ? Give the preparation and structure of IF_7 .
- (c) What are Pseudo-halogens ? What is the action of cyanogen on :
- (i) O_2
 - (ii) Alkali metal
 - (iii) KOH.
- (d) (i) Why are Interhalogens more reactive than halogens ? Explain.
- (ii) Write a note on Ultramarine.