BF—50—2016

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2016

CHEMISTRY

Paper IX

(Physical + Inorganic Chemistry)

(MCQ & Theory)

(Saturday, 15-10-2016)   **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 Hours   *Maximum Marks—40*

N.B. :— (i) *All* questions carry equal marks.

(ii) Attempt *All* questions.

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

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

(v) Use black ball 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) The unit of rate constant for first order reaction is :

(a) Mole lit^{-1} time^{-1} (b) Mole^{-1} lit time^{-1}

(c) time^{-1} (d) Mole^{-2} lit^{-2} time^{-1}

(ii) Which of the following statements is *incorrect* about molecularity of reaction ?

(a) It is theoretical concept

(b) It is invariant for a chemical reaction

(c) It can have fractional value

(d) It can not have zero value

P.T.O.

(*iii*) The value of ionic product of water at 25°C is :

(*a*) 1×10^{-7} (*b*) 1×10^{-14}

(*c*) 1×10^{-10} (*d*) 1×10^{7}

(*iv*) Electrolytic conductance is measured with the help of :

(*a*) Potentiometer   (*b*) Colorimeter

(*c*) Polarimeter   (*d*) Wheatstone's bridge

(*v*) The transport no. of H^+ ion in HCl solution was found to be 0.82. Then transport no. of Cl^- ion is :

(*a*) 0.18   (*b*) 0.018

(*c*) 3.6   (*d*) 0.82

(*vi*) The number of photons that passes through per unit area in a unit time is called :

(*a*) amplitude of light   (*b*) frequency of light

(*c*) intensity of light   (*d*) wavelength of light

(*vii*) A species which can absorb or transfer radiant energy for activation of reactant molecule is called :

(*a*) Radiative substance

(*b*) An ionizer

(*c*) Photochemical substance

(*d*) Photosensitizer

(*viii*) Amphiholes is an example of :

(*a*) Simple chain silicates

(*b*) Double chain silicates

(*c*) Two-dimensional silicates

(*d*) Three-dimensional silicates

(*ix*) Interhalogen or halogen + halide = ...

(*a*) Halides   (*b*) Halogens

(*c*) Cynogens   (*d*) Polyhalides

(*x*) The *correct* increasing order of strength of oxy acids of halogen is :

(*a*) $HClO < HClO_2 < HClO_3 < HClO_4$

(*b*) $HClO > HClO_2 > HClO_3 > HClO_4$

(*c*) $HClO < HClO_2 > HClO_3 > HClO_4$

(*d*) $HClO > HClO_2 < HClO_3 > HClO_4$

(Theory)

Section A

(Physical Chemistry)

2. Solve any *two* of the following : 2×5=10

(*a*) Explain the factors affecting the rate of chemical reactions.

(*b*) Explain :

(*i*) Relaxation effect

(*ii*) Electrophoretic effect.

(*c*) Draw well labelled Joblanski Diagram to explain photophysical pathways. Explain fluorescence.

(*d*) For a certain first order reaction halflife period is 100 sec. How long will it take for 75% completion of reaction ?

3. Solve any *two* of the following : 2×5=10

(*a*) (*i*) Derive the equation for rate constant of second order reaction with equal concentration of reactants. 3

(*ii*) In a photochemical reaction 6.02×10^{19} molecules were decomposed giving quantum yield 10. Calculate No. of photons absorbed. 2

(*b*) State the principle of conductometric titration. Explain weak-acid strong base conductometric titration.

(*c*) State Lambert-Beer's Law. Derive the equation for optical density.

(*d*) The resistance of decinormal solution of KCl was found to be 250 ohms. Calculate equivalent conductance of solution when two platinum electrodes dipping into it are 2.5 cm apart having cross-sectional area 7.5 cm^2.

Section B

(Inorganic Chemistry)

4. Answer any *two* of the following : 2×5=10

    (a) What are silicates ? Give their classification on the basis of the linkage of discrete SiO_4^{-4} tetrahedral unit.

    (b) Give the preparation and uses of Teflon.

    (c) What are interhalogen compounds ? Why are interhalogen compounds more reactive than halogen ? Explain.

    (d) Describe the structure of ICl_2^- & ICl_4^- polyhalide ions.