This question paper contains **4** printed pages]

W—51—2018
FACULTY OF SCIENCE
B.Sc. (Second Year) (Fourth Semester) EXAMINATION
OCTOBER/NOVEMBER, 2018
(CBCS/CGPA Pattern)
CHEMISTRY
Paper IX
(Physical Chemistry and Inorganic Chemistry)
(MCQ+Theory)

(Saturday, 13-10-2018)   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 answer-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*)   Which three factors affect the rate of a chemical reaction ?

     (A)   Temperature, pressure and humidity

     (B)   Temperature, product concentration and container volume

     (C)   Temperature, product concentration, humidity

     (D)   Temperature, reactant concentration and catalyst

   (*ii*)   Which reaction is pseudo-unimolecular ?

     (A) $H_2 + Cl_2 \rightarrow 2HCl$

     (B) $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$

     (C)   acid-catalyzed hydrolysis of an ester

     (D)   base-catalyzed hydrolysis of an ester

P.T.O.

(*iii*) For strong electrolytes, the degree of dissociation is :

(A) nearly equal to one (B) zero

(C) nearly equal to infinity (D) all of these

(*iv*) Specific conductivity is equal to :

(A) Cell constant × resistance

(B) Cell constant ÷ Resistance

(C) Resistance × Observed conductance

(D) None of the above

(*v*) If λ_∞ and λ_v are equivalent conductance at infinite dilution and at 'v' dilution, the degree of dissociation 'α' is given by :

(A) $\dfrac{\lambda_v}{\lambda_\infty}$ (B) $\dfrac{\lambda_\infty}{\lambda_v}$

(C) $\lambda_v + \lambda_\infty$ (D) $\lambda_v - \lambda_\infty$

(*vi*) .... stops as soon as the incident radiation is cut-off.

(A) Chemiluminescence (B) Fluorescence

(C) Phosphorescence (D) Both (A) and (B)

(*vii*) "It is only the observed light radiations that are effective in producing a chemical reaction." This is the statement of :

(A) Lambert law (B) Stark-Einstein law

(C) Lambert-Beer law (D) Grothus-Draper law

(*viii*) The structure of XY_3 types of interhalogen compound such as ClF_3 or ICl_3 is ....

(A) Bent-T shaped (B) Linear

(C) Square planar (D) Tetrahedral

(*ix*) The formula of Teflon is :

(A) CCl_2F_2 (B) C_6F_{12}

(C) $(-CF_2=CF_2^-)_n$ (D) None of these

(*x*) Zeolites are microporous :

(A) Cobalt silicates (B) Potassium silicates

(C) Aluminosilicates (D) Gold silicates

(Theory)

Section A : Physical Chemistry

2. Solve any *two* of the following :

(*i*) What is activation energy ? Derive Arrhenius equation.

(*ii*) The half life of a substance in a first order reaction is 15 minutes. How long will it take for the reaction to be completed 75% ?

(*iii*) Explain :

(*a*) Photosensitized reaction

(*b*) Phosphorescence process.

(*iv*) Explain Arrhenius theory of electrolytic dissociation and give its limitations.

3. Solve any *two* of the following :

(*i*) A $\dfrac{N}{50}$ NaOH solution offered a resistance of 32 ohm in a conductivity cell at 298 K. If the cell constant of the cell is 0.297 cm^{-1}, find out the molar conductivity of sodium hydroxide solution.

(*ii*) State and explain Kohlrausch's law. Mention its any *three* applications.

(*iii*) (*a*) State and Lambert-Beer law.   2

(*b*) Explain order and molecularity of the reaction.   3

(*iv*) What is quantum yield ? How can it be experimentally determined ?

Section B : Inorganic Chemistry

4. Answer any *two* of the following :

   (*a*) What are silicates ? Discuss the formation of basic unit in silicates.

   (*b*) What are interhalogen compounds ? Give the preparation and structure of XY type of interhalogens.

   (*c*) What are fluorocarbons ? Give their uses :

   (*d*) (*i*) Give preparation methods of ICl_2^-.

   (*ii*) Write the properties of SiC.