

F.Y.B.SC. SEM – I (CBCS - 2016 COURSE) : SUMMER - 2018  
SUBJECT: CHEMISTRY: PHYSICAL & INORGANIC CHEMISTRY-I

Day: **Thursday**  
Date: **12/04/2018**

Time: **11.00 A.M. TO 02.00 PM**  
Max. Marks: 60

**S-2018-0618**

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answer to both the sections should be written in **SAME** answer book.
- 4) Use of **log table/ scientific** calculator is allowed.

**SECTION-I**

**Q.1 A)** Select the most correct alternative from among those given below: **(06)**

- a)** Integration of  $dx$  is
- |              |             |
|--------------|-------------|
| i) $x$       | ii) $x + C$ |
| iii) $x - C$ | iv) $C$     |
- b)** The distribution of solute between two immiscible solvents is called ..... of a substance.
- |                      |                   |
|----------------------|-------------------|
| i) Partition         | ii) solvation     |
| iii) both i) and ii) | iv) none of these |
- c)** If one of the reactants in a bimolecular reaction is present in large excess, the reaction becomes kinetically of.....
- |                  |                   |
|------------------|-------------------|
| i) second order  | ii) third order   |
| iii) first order | iv) none of these |
- d)** Molecular weight.....
- |                              |                              |
|------------------------------|------------------------------|
| i) $2 \times$ vapour density | ii) gram mole $\times$ liter |
| iii) volume $\times 22.4$    | iv) $2 \times$ atomic weight |
- e)** ppm and ppb are convenient units to express concentration when.....
- i) solute is present in major quantities
  - ii) solute is present in trace quantities
  - iii) solute is present in excess quantities
  - iv) solute is present in moderate quantities
- f)** The oxidation number of Fe in  $FeCl_3$  is
- |         |          |
|---------|----------|
| i) +2   | ii) -1   |
| iii) +3 | iv) zero |

**B)** Answer the following in **ONE** sentence: **(06)**

- a)** Define chemical kinetics.
- b)** What is dilute solution?
- c)** What is rate constant?
- d)** If  $y = u - v$  then  $\frac{dy}{dx} = ?$
- e)** Define the term slope.
- f)** Complete the reaction  $C_{12}H_{22}O_{11} + H_2O \rightarrow \dots\dots\dots$

**P. T. O.**

**Q.2** Attempt any **THREE** of the following: (12)

- Give the examples of the third order reaction.
- Describe the term order of reaction.
- Derive the characteristic equation for the velocity constant of the first order reaction.
- What are the limitations of the distribution law?

**Q.3** Attempt any **FOUR** of the following: (12)

- Integrate  $\int 2x^2 \left( 3x^2 + \frac{5}{x^2} \right) dx$
- If  $y = x^7 + x^3$  then  $\frac{dy}{dx} = ?$
- If  $y = (x^2 - 2)(x + 2)$ ,  $\frac{dy}{dx} = ?$
- Iodine has the same molecular weight in water and  $\text{CCl}_4$ . When varying amounts of iodine were shaken with water and  $\text{CCl}_4$  mixture, the following results were obtained:

$C_{\text{H}_2\text{O}}$ (Mol/ dm <sup>3</sup> )	0.000321	0.000502	0.000762
$C_{\text{C}_6\text{H}_6}$ Mol/dm <sup>3</sup> )	0.02736	0.04282	0.06533

Calculate the partition coefficient of iodine between water and  $\text{CCl}_4$ .
- For a certain first order reaction, the time for half change is 72min. How much time will be required for the completion of 90% reaction?

**Q.4** A) Answer any **ONE** of the following: (06)

- Discuss the modifications of distribution law with reference to association and dissociation of solute in one of the solvents.
- Derive kinetic equation for velocity constant for second order reaction when  $a = b$ .

#### SECTION-II

**B)** Attempt any **ONE** of the following: (06)

- Define the terms with suitable examples
  - Reduction
  - Oxidizing agents
  - Oxidation
- Define valency and oxidation number and calculate oxidation number of
  - 'S' in  $\text{Na}_2\text{S}_2\text{O}_3$
  - 'N' in  $\text{HNO}_3$

**Q.5** Attempt any **TWO** of the following: (12)

- What will be the normality of following solutions?
  - 100ml containing 0.315g nitric acid (eq. wt = 63)
  - 100 ml containing 0.1575g Crystalline oxalic acid ( eq. wt = 63)
- Explain following terms:
  - Standard solution
  - Primary standard substance
  - Secondary standard substance
- Suppose 15 ml of a solution of HCl were found to neutralize 22.5 ml of 0.12N NaOH solution. What is the strength of acid solution in grams per liter?