V—48—2017

FACULTY OF SCIENCE

B.Sc. (First Semester) EXAMINATION

OCTOBER/NOVEMBER, 2017

(CBCS/CGPA Pattern)

CHEMISTRY

Paper (CCCI)

(Physical and Inorganic Chemistry—II)

(Saturday, 14-10-2017)   **Time : 10.00 a.m. to 12.00 noon**

Time—Two 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 and logarithmic table is allowed.

    (v)   Only one answer sheet should be use for section 'A' and 'B'.

MCQ   10

1.   Select the correct answer for each of the following multiple choice questions.

    (i)   The value of $\log_{10} (10^{-4})$ is equal to :

        (a)   4   (b)   –4

        (c)   3   (d)   –3

    (ii) $\int \sec^2 x \, dx = ?$

        (a) $\sin x$ (b) $\cos x$

        (c) $\tan x$ (d) $\operatorname{cosec} x$

P.T.O.

(*iii*) Langmuir Isotherm holds at low pressures but fails at :

(*a*) High pressure

(*b*) Low temperature

(*c*) Intermediate pressure

(*d*) None of these

(*iv*) The critical temperature of CO_2 gas is :

(*a*) 21ºC

(*b*) 25ºC

(*c*) 31ºC

(*d*) 50ºC

(*v*) At constant temperature, which of the following pairs of gas molecules have the same RMS velocity ?

(*a*) CO and O_2

(*b*) CO and N_2

(*c*) N_2 and CO_2

(*d*) CO_2 and CO

(*vi*) The ratio of spacing in case of sodium chloride (NaCl) crystal is :

(*a*) 1 : 0.704 : 1.136

(*b*) 0.705 : 1.50 : 1.135

(*c*) 1 : 0.504 : 0.75

(*d*) None of these

(*vii*) If the intercepts along axes are a, $3b$ and $2c$, then Miller indices for a plane are :

(*a*) (2, 6, 3)

(*b*) (1, 2, 3)

(*c*) (6, 2, 3)

(*d*) (6, 3, 2)

(*viii*) Which of the following imparts brick red colour to the flame ?

(*a*) Ca

(*b*) Ba

(*c*) Sr

(*d*) None of these

(*ix*) Li_2CO_3 is ....

(*a*) Soluble in H_2O

(*b*) Sparingly soluble in H_2O

(*c*) Insoluble in H_2O

(*d*) None of these

(*x*) Oxidation number of 'S' in $Na_2S_2O_3$ is ....

(*a*) $+1$

(*b*) -1

(*c*) $+2$

(*d*) -2

Theory

(Physical Chemistry)

2. Answer any *two* of the following :

(*a*)   Derive the relationship between critical constants and ven der Waals constants.

(*b*)   Define 'Centre of Symmetry.'

Derive Bragg's equation, $nx = 2d \sin \theta$.

(*c*)   State Freundlich adsorption isotherm. Give the difference between physical adsorption and chemical adsorption.

(*d*)   Give the relation between pH and pOH. Calculate pOH of 0.025 M NaOH solution.

3. Answer any *two* of the following :

(*a*)   State the law of constancy of interfacial angles. Explain various types of cubic lattices.

(*b*)   Define 'Compressibility factor'. Calculate the RMS velocity of CO_2 molecule at 273 K. ($R = 8.314$ JK^{-1} mol^{-1}).

(*c*)   (*i*)   What are the factors affecting adsorption ?

(*ii*)   Discuss 'Claude's method' of liquification of gases.

(*d*)   (*i*)   Find the equation of straight line passing through a point (3,4) having slope 6.

(*ii*)   Evaluate $^5P_4$.

(Inorganic Chemistry)

4. Answer any *two* of the following :

(*a*)   Explain the anomolous behaviour of lithium.

(*b*)   Discuss the basic strength of hydroxides of *s*-block elements.

(*c*)   (*i*)   Explain the complex of alkali metal with salicylaldehyde.

(*ii*)   Define Oxidation, Reduction, Oxidizing agent and reducing agent by Oxidation number concept.

(*d*)   Discuss the balancing of redox reaction by ion-electron method with suitable example.