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B—69—2019

FACULTY OF SCIENCE

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

MARCH/APRIL, 2019

(CBCS/CGPA)

CHEMISTRY

Paper VII

(Physical and Inorganic Chemistry)

(MCQ+Theory)

(Tuesday, 26-3-2019)

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 (OMR sheet) for MCQ (Q. No. 1).*

(MCQ)

1. Select the correct answer for each of the following multiple choice questions :
 - (i) In photoelectric effect the number of electrons ejected from metal surface increases with increase in of incident light.

(A) Wavelength	(B) Frequency
(C) Intensity	(D) Velocity
 - (ii) If uncertainty in position of electron is zero, the uncertainty in its momentum would be

(A) Zero	(B) Infinity
(C) $< \frac{h}{2\lambda}$	(D) $> \frac{h}{2\lambda}$

P.T.O.

- (iii) In phase diagram of CO_2 , triple point temperature is
- (A) -57K (B) -57°C
(C) 0°C (D) 157°C
- (iv) For one component and three phase system, at triple point number of degree of freedom is
- (A) Zero (B) One
(C) Two (D) Three
- (v) Efficiency of heat engine operating in temperature limit 500 K to 300 K is
- (A) 0.2 (B) 0.4
(C) 0.6 (D) 0.3
- (vi) The maximum entropy is in which of the following :
- (A) ice (B) water
(C) water vapours (D) snow
- (vii) For ideal behaviour of gas, the value of Joule-Thomson coefficient (μ_{JT}) is
- (A) +ve (B) -ve
(C) zero (D) infinity
- (viii) When radioactive nucleus emits an α -particles, atomic number and mass number of atom
- (A) remains same (B) increases
(C) decreases (D) none of these
- (ix) The triad of nuclei that is isotonic is
- (A) ${}^{14}_6\text{C}$, ${}^{15}_7\text{N}$, ${}^{17}_9\text{F}$ (B) ${}^{12}_6\text{C}$, ${}^{14}_7\text{N}$, ${}^{17}_9\text{F}$
(C) ${}^{14}_6\text{C}$, ${}^{14}_7\text{N}$, ${}^{17}_9\text{F}$ (D) ${}^{12}_6\text{C}$, ${}^{14}_7\text{N}$, ${}^{19}_9\text{F}$
- (x) The quantitative determination of analyte calculation through the process of precipitation of analyte is called analysis.
- (A) Spectrometric (B) Volumetric
(C) Both (A) and (B) (D) Gravimetric

(Theory)**Section A : (Physical Chemistry)**

2. Attempt any *two* of the following : 10
- (a) Derive Schrodinger's wave equation.
 - (b) Draw a well labelled phase diagram of water system and discuss its salient features.
 - (c) What is entropy ? Give its mathematical equation and unit. Explain entropy change in fusion of solid.
 - (d) Calculate the deBroglie's wavelength of a body of mass 0.1 kg moving with velocity 1000 ms^{-1} ($h = 6.626 \times 10^{-34} \text{ Js}$).
3. Attempt any *two* of the following : 10
- (a) (i) Explain Planck's quantum theory of radiation.
(ii) Explain phenol-water system.
 - (b) Describe phase diagram of Pb-Ag system.
 - (c) Describe Carnot cycle.
 - (d) (i) Calculate entropy change when 2 moles of an ideal gas are allowed to expand isothermally at 293 K from pressure of 20 atm to 10 atm ($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$).
(ii) 30.4 kJ of heat is required to melt one mole of NaCl and melting point of NaCl is 1070.4 K. Calculate entropy change melting of one mole of NaCl.

P.T.O.

Section B : (Inorganic Chemistry)

4. Attempt any *two* of the following : 10
- (a) (i) Write a note on magic numbers.
 - (ii) What is meant by digestion of precipitate.
 - (b) Discuss the condition of completeness of precipitate from a solution.
 - (c) What is nuclear fusion reaction ? Explain hydrogen bomb.
 - (d) What is meant by packing fraction ? How does it predict stability of nucleus.