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BF—56—2016

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2016

CHEMISTRY

Paper VII

(Physical and Inorganic Chemistry)

(MCQ + Theory)

(Monday, 17-10-2016)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—10+30=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 No. 1.

MCQ

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

(1) In photoelectric effect, the kinetic energy of photoelectron is proportional to :

(A) Frequency of the incident light

(B) Intensity of the incident light

(C) Velocity of the incident light

(D) All of the above

(2) The de-Broglie wavelength of a body of mass 2 kg moving with a velocity of 1000 ms^{-1} is ($h = 6.626 \times 10^{-34} \text{ Js}$)

(A) $6.626 \times 10^{-34} \text{ m}$ (B) $2.303 \times 10^{-31} \text{ m}$

(C) $6.626 \times 10^{-34} \text{ m}$ (D) $3.313 \times 10^{-37} \text{ m}$

(3) The entropy of the system increases in the order

(A) gas < liquid < solid (B) gas < solid < liquid

(C) solid < liquid < gas (D) None of these

P.T.O.

- (4) The standard entropy $[S^\circ]$ of a substance is
- (A) Its entropy at 25 K and 1 atm. pressure
 - (B) Its entropy at 25°C and 1 atm. pressure
 - (C) Its entropy at 0°C and 1 atm. pressure
 - (D) Its entropy at 0 K and 1 atm. pressure
- (5) “Every perfect engine working reversibly between the same temperature limits has the same efficiency, whatever be the working substance”. This is statement of
- (A) Efficiency of Carnot engine
 - (B) Joule Thomson effect
 - (C) First law of thermodynamics
 - (D) Carnot theorem
- (6) Mathematically, the phase rule equation can be expressed as
- (A) $F + P = C + 2$
 - (B) $F = C + P + 2$
 - (C) $P = C + F + 2$
 - (D) None of these
- (7) The number of components in a solution of common salt is
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
- (8) ${}_{18}^{40}\text{Ar}$, ${}_{19}^{40}\text{K}$, ${}_{20}^{40}\text{Ca}$ are examples of
- (A) Isotopes
 - (B) Isobars
 - (C) Isotones
 - (D) None of these
- (9) Which of the following are magic numbers ?
- (A) 2, 8, 20, 50, 82, and 126
 - (B) 3, 9, 21, 52, 83, 128
 - (C) 4, 10, 22, 54, 85, 130
 - (D) None of the above

- (10) During Ignition and Incineration, Precipitate is generally converted into its compound of
- (A) Hydration having definite composition
 - (B) Definite composition
 - (C) Variable composition
 - (D) None of the above

Theory

Section A

(Physical Chemistry)

2. Answer any *two* of the following :
- (a) State and explain photoelectric effect on the basis of quantum theory.
 - (b) What is efficiency of heat engine ? Calculate the maximum efficiency of an engine operating between 127°C and 27°C.
 - (c) Draw a phase diagram and discuss the application of phase rule for KI – H₂O system.
 - (d)
 - (i) What is the minimum energy that photon required in order to produce photo-electric effect with platinum metal, the threshold frequency is $1.3 \times 10^{15} \text{ sec}^{-1}$. ($h = 6.626 \times 10^{-34} \text{ Js}$)
 - (ii) Explain the terms, phase and component with suitable examples.
3. Answer any *two* of the following :
- (a) What is critical solution temperature ? Explain phenol-water system.
 - (b) Explain need for second law of thermodynamics.
Give any *three* statements of second law of thermodynamics.
 - (c)
 - (i) Calculate the entropy change involved in thermodynamic isothermal expansion of three moles of a gas from volume 5 litres to a volume of 50 litres at 303 K.
 - (ii) Molar heat of fusion of one mole of sodium chloride is 25.4 kJ and its melting point is 1070 K. Calculate the entropy change.

P.T.O.

- (d) (i) Draw neatly the phase diagram of water system.
- (ii) Write Schrodinger's wave equation and mention different terms involved in it.

Section B

(Inorganic Chemistry)

4. Answer any *two* of the following :
- (a) Explain the effect of odd-even number of protons and neutrons on Nuclear Stability.
- (b) What is nuclear fission reaction ? How is it used in preparation of plutonium bomb.
- (c) Describe in brief the conditions of completeness of precipitation.
- (d) (i) Write a note on carbon dating.
- (ii) Explain the effect of temperature on precipitation.