Progressive Education Society's

Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16, NEP 2020 (Autonomous)

End Semester Examination: Nov/Dec 2023

***Total No. of Questions**: 4* ***Total No. of Pages**: 2*

First Year (Class Name)

COURSE CODE: CHE11101

COURSE NAME: Basics in Physical Chemistry

(Semester I)

Program: B.Sc. **Credits: 2**
Program Specific: B.Sc. Chemistry **Time: 2 Hours**
Course Type: Major **Max. Marks: 30**
SET: A

Instructions to the candidate:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw a well labeled diagram wherever necessary.*

Q1) Answer the following. **[5 X 1 =05]**

1. What is Open system and a closed system?
2. Define the term Critical temperature.
3. What is meant by the Compressibility Factor?
4. Define the term Threshold frequency.
5. Define the term pH.

Q2) Answer the following (Attempt any 5/7) **[5 X 2 = 10]**

1. Give the statement of de Broglie hypothesis and write de Broglie's equation.
2. What is the Buffer solution? Enlist the types of Buffer solution.
3. Distinguish between liquids and gasses.
4. Given that the work function for sodium metal is 1.82 eV, calculate the threshold frequency υ_o for sodium. (1 eV = $1.602 \cdot 10^{-19}$ J, h = $6.62 \cdot 10^{-34}$ Js)
5. What is the extensive property and intensive property?
6. What is meant by weak electrolyte and strong electrolyte?
7. State the First Law of Thermodynamics.

Q3) Answer the following (Attempt any 2/4) **[2 X 5 = 10]**

1. Write Postulate of Kinetic Theory of Gases.
2. Calculate ΔH^O for the reaction:

$$CO_2(g) + H_2(g) \longrightarrow CO(g) + H_2O(g)$$

Given: ΔH^0_f for CO_2 (g), CO(g) and H_2O (g) are -393.5 , -111.3 and-241.8 kJ mol^{-1} respectively.

P.T.O.

3. Write a note on Photoelectric effect.
4. Calculate the pH of the buffer solution containing 0.04 M acetic acid and 0.05M sodium acetate.
   [Given: Ka of acetic acid = 1.82×10^{-5}]

Q4) Answer the following (Attempt any 1/2) [1 X 5 = 05]

1. Calculate the critical volume of gas whose critical pressure and temperature are $77.11 \cdot 10^5$ Nm^{-2} and 417.7 K respectively.
   Given: R = 0.08309 x 10^5 Nm^{-2} dm^3 $mole^{-1}$ K^{-1}.

2. State and explain postulates of Bohr's Atomic Theory.

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