This question paper contains **2** printed pages]

NA—13—2023

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(CBCS/New Pattern)

CHEMISTRY

Paper–II

(Physical and Inorganic Chemistry)

(Wednesday, 6-12-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Use of calculator and logarithmic table is allowed.

1. Solve any *three* of the following : 15

(*a*) Explain the hydrides of group IA and IIA in brief.

(*b*) (*i*) Give the formation of complex of sodium with Salicyladehyde.

(*ii*) Explain the flame colouration of group IA element.

(*c*) Discuss the carbonates and bicarbonates of s-block elements.

(*d*) Write the rules for assigning oxidation number.

(*e*) Define oxidation, reduction, oxidizing agent and reducing agent according to electronic concept.

P.T.O.

2. Solve any *three* of the following : 15

(*a*) Derive an expression for critical constants in terms of van der Waal's constants '*a*' and '*b*'.

(*b*) State and explain 'Permutation'. Evaluate the value of $^{10}P_3$.

(*c*) Discuss the factors affecting adsorption.

(*d*) Explain the determination of crystal structure of potassium chloride (KCl) by X-ray diffraction method.

(*e*) Define ideal and non-ideal gases. Calculate the root mean square velocity of O_2 molecule of 37°C.

(Given : R = 8.314 JK^{-1} mol^{-1})

3. Solve any *two* of the following : 10

(*a*) Define 'Axis of symmetry'. Explain the law of rational indices.

(*b*) What is 'adsorption isotherm' ? Explain Langmuir adsorption isotherm.

(*c*) Explain the deviation of gases from ideal behaviour.

(*d*) What is S.I. unit of 'Force' and 'Density' ? Calculate the pH of 0.002 M NaOH solution.