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VA—19—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/New Pattern)

CHEMISTRY

Paper–VII

(Physical and Inorganic Chemistry)

(Tuesday, 3-12-2024) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

(*a*) What is radioactivity ? Explain the characteristics of β(beta) particle.

(*b*) Explain the nuclear stability on the basis of N/Z ratio and packing fraction.

(*c*) Write notes on :

(*i*) Group displacement law

(*ii*) Carbon dating.

P.T.O.

(*d*) Explain any *two* factors affecting on precipitation.

(*e*) Explain the following steps involved in gravimetric analysis :

(*i*) Digestion

(*ii*) Filtration and washing.

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

(*a*) Derive de-Broglie's equation. Calculate de-Broglieœ's wavelength of a body of mass 100 gm moving with velocity 1000 m/s.

($h = 6.626 \times 10^{-34}$J.s)

(*b*) Explain photoelectric effect on the basis of quantum theory.

(*c*) State first law of thermodynamics and give need for second law of thermodynamics.

(*d*) Discuss entropy change in :

(*i*) Fusion of solid.

(*ii*) Vaporization on liquid.

(*e*) Explain sulphur system with phase diagram.

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

(*a*) State the explain Compton effect.

(*b*) Write the physical significance of entropy. Calculate the change in entropy for fusion of 1 mole of ice. The melting point of ice is 273 K and molar enthalpy of fusion of ice is 6.0 kJ mol^{-1}.

(*c*) Explain Nernst heat theorem. State third law of thermodynamics.

(*d*) Describe Pb-Ag system on the basis of phase rule.