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SA—19—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

CHEMISTRY

(Physical and Inorganic Chemistry-VII)

(Friday, 11-4-2025) **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 : 3×5=15

(*a*) Write applications of radioisotopes in medicine and agricultural field.

(*b*) Define Radioactivity. Give the characteristics of β-particles.

(*c*) Explain stability of nucleus on the basis of :

(*i*) Odd and even number of protons and neutrons

(*ii*) N/Z ratio.

(*d*) What are the types of precipitates ? Explain factors affecting on precipitation.

P.T.O.

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

(*i*) Filtration and washing

(*ii*) Ignition and incineration.

2. Attempt any *three* of following : 3×15=15

(*a*) Calculate the de-Broglie wavelength of electron moving with a velocity of 3×10^8 m/s.

(Given : $me = 9.11 \times 10^{-31}$ kg and $h = 6.626 \times 10^{-34}$ Js)

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

(*c*) State third law of thermodynamics. Write any *three* statements of second law of thermodynamics.

(*d*) Derive an expression for entropy change of an ideal gas as a function of pressure and temperature.

(*e*) Describe the phase diagram of sulphur system.

3. Attempt any *two* of the following : 2×5=10

(*a*) Derive Schrodinger's wave equation.

(*b*) Explain Joule's law and explain Joule-Thomson effect.

(*c*) Discuss entropy change for phase transfer from one crystalline form to another. Calculate entropy change when are mole of rhombic sulphur to monoclinic sulphur.

The heat of transition of process carried out reversibly its 322.17 $Jmol^{-1}$ at transition temperature 95.6ºC.

(*d*) Define phase, component and degree of freedom with suitable example.