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SB—34—2022

FACULTY OF SCIENCE

B.Sc. (Third Semester) EXAMINATION

MAY/JUNE, 2022

(CBCS/New Pattern)

CHEMISTRY

Paper-VII

(Physical and Inorganic Chemistry)

(Thursday, 9-06-2022) **Time : 2.00 p.m. to 4.30 p.m.**

Time— 2½ *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

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

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

(*i*) What is Radioactivity ? Give the characteristic properties of α-particle.

(*ii*) Define the following terms :

(*a*) Isotopes

(*b*) Isobars

(*c*) Isotones

(*d*) Isomers

(*e*) Nuclear fission

(*iii*) Explain the stability of Nucleus on the basis of Neutron/Proton ratio and Magic Numbers.

(*iv*) What is gravimetric analysis ? Explain the steps involved in Gravimetric analysis.

P.T.O.

(*v*) Define Precipitation. Explain different types of precipitation with suitable example.

2. Solve any *three* of the following : 3×5=15

(*i*) State and explain photoelectric effect.

(*ii*) Write a note on Planck's quantum theory. Calculate the de-Broglie wavelength of electron moving with a velocity of 3×10^8 m/s (Given mass of electron = 9.11×10^{-31} kg & $h = 6.626 \times 10^{-34}$ Js).

(*iii*) Write any *four* statements of first law of thermodynamics and give its mathematical expansion.

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

(*v*) Describe the phase diagram of Water system.

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

(*i*) Derive Schrodinger wave equation.

(*ii*) Give the statement of Third Law of Thermodynamics. Explain Nernst heat theorem.

(*iii*) Define entropy and give its unit. Calculate the entropy change when one mole of ethanol is evaporated at 351 K. The molar heat of vaporisation of ethanol is 39840 J mol^{-1}.

(*iv*) Explain upper critical solution temperature with suitable example.