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SA—03—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper—XV

(Physical & Inorganic Chemistry)

(Friday, 4-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

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

(ii) Use of logarithmic table and non-scientific calculator is allowed.

1. Answer any *three* of the following : 3×5=15

(a) Describe the function of haemoglobin in living room.

(b) Explain biological role of alkali and alkaline earth metal ion in biological system.

(c) Describe 'three centered two electron bond' in diborane.

(d) Describe the structure of dicarbaclosodecacarborane.

(e) What is Wade rule ? Calculate the total number of electrons in $B_{12}H_{12}^{-2}$.

P.T.O.

2. Answer any *three* of the following :

3×5=15

- (a) What are reversible cells ? Give examples.
- (b) What is EMF of cell ? How is it measured ?
- (c) Explain variation of chemical potential with pressure.
- (d) The equilibrium constant (K_p) of the reaction $2\text{H}_2\text{O}(g) \rightleftharpoons 2\text{H}_2(g) + \text{O}_2(g)$ is 13.5×10^{-21} at 1000 K and at 1 atm pressure. Calculate the chemical affinity (ΔG°) of the above reaction in calories.
- (e) Describe the determination of molecular weight of a solute from relative lowering of vapour pressure.

3. Answer any *two* of the following :

2×5=10

- (a) Explain construction and working of calomel electrode.
- (b) Derive expression for variation of work function with temperature and volume.
- (c) Derive Van't Hoff's isotherm.
- (d) The normal boiling point of ethyl acetate is 77.06°C . A solution of 50 g of a non-volatile solute in 150 g of ethyl acetate boils at 84.27°C . Evaluate the molar mass of solute if K_b for ethyl acetate is $2.77^\circ\text{C kg mol}^{-1}$.