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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Non-Medical) (Sem.–5) PHYSICAL CHEMISTRY-III Subject Code : BSNM-502-18 M.Code : 78616 Date of Examination : 19-12-22

Time: 3 Hrs.

Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define specific conductance.
- b) Mention the unit of cell constant.
- c) Write down the chemical formula of transport number of cations.
- d) Write down Nernst equation.
- e) Mention any two examples of reference electrode.
- f) Define standard electrode potential.
- g) Write down Henderson-Hassalbalch equation.
- h) What is meant by nuclear stability?
- i) Calculate the total degree of freedom and vibrational degree of freedom for CO_2 molecule.
- j) Mention the selection rule for Raman spectroscopy.

SECTION-B

- 2. How concentration cells are different from electrolytic cells?
- 3. Specific conductance of a solution of KCl at 25°C is 1.12 Sm⁻¹. The resistance of a conductivity cell containing the solution is 55 ohm. Calculate the cell constant.
- 4. Estimate the age of a sample of pitchblende mineral which the amount of 238 U is 75% and 206 Pb is 15%. Given $t_{1/2}$ of 238 U= 4.51 × 10⁹ years.
- 5. Write short notes on nuclear fission and fusion reaction.
- 6. How do you determine the wavelength of a diatomic molecule from rotational spectra?

SECTION-C

- 7. Explain the terms activity coefficient and mean activity coefficient. Discuss the Debye-Huckel limiting law.
- 8. Derive the mathematical expression for the law of radioactive disintegration. Discuss the principle underlying potentiometric titrations.
- 9. Assuming the rigid rotor model, derive the expression of rotational energy for a diatomic molecule.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.