Exam. Code : 103205
Subject Code : 8053

B.A./B.Sc. 5th Semester (Old Sylb 2017)

CHEMISTRY (PHYSICAL CHEMISTRY–III)

Time Allowed—3 Hours] [Maximum Marks—35

Note :—(1) Part A is compulsory. Each question carries **1** mark.

(2) Attempt **TWO** questions each from the Sections **I, II** and **III** in Part **B**. Each question carries **4.5** marks.

PART—A

1. Define corrosion and what are its types ?
2. Distinguish between electrolytic and galvanic cells.
3. Write Ostwald dilution law explaining each term.
4. What is nuclear reaction cross section ?
5. Define nuclear spin and nuclear momentum.
6. What is Raman Spectrum ?
7. What is qualitative relation between force constant and bond energies ?
8. Write selection rules for electronic transitions and their significance. 1×8

PART—B

SECTION—I

9. (a) Explain Kohlaursch law and what is its basis ?
   (b) What is Arrhenius theory of electrolytes and what are its limitations ? 2.5.2.0
10. (a) Define single electrode potential.
    (b) How can ΔG, ΔH and K can be determined using EMF ? 1.0,3.5

11. (a) Define pH and pKa.

(b) Describe concentration cells with and without transport with suitable examples. 1.0,3.5

SECTION—II

12. (a) Distinguish between nuclear fission and nuclear fusion with appropriate examples.

(b) Write applications of radioactivity. 2.0,2.5

13. (a) Describe Soddy Fajan group displacement law.

(b) Explain nuclear structure, mass defects and nuclear stability. 2.5,2.0

14. (a) What are the means of measuring nuclear decay ?

(b) What are high energy nuclear reactions ? 3.0,1.5

SECTION—III

15. (a) What is role of isotope effect on rotational spectrum ?

(b) To a good approximation, the microwave spectrum of $H^{35}Cl$ consists of a series of equally spaced lines, separated by 6.26×10^{11}Hz. Calculate bond length of $H^{35}Cl$. 2,2.5

16. (a) Explain P, Q and R branches in vibrational rotational spectrum.

(b) Draw energy levels of harmonic oscillator. How force constant can be evaluated ? 2,2.5

17. (a) What is Frank Condon principle ?

(b) What are selection rules for electronic transitions ?

(c) Explain origin of Raman spectrum. 1.0,1.0,2.5