Reg. No. : ....

Name : ....

Sixth Semester B.Sc. Degree Examination, March 2021

First Degree Programme under CBCSS

Chemistry

Core Course XII

CH 1643 – PHYSICAL CHEMISTRY III

(2015-2016 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

*(Answer **all** questions. Answer in one word to maximum two sentences. Each questions carries **one** mark)*

1. What is the unit of second order reaction?

2. Define activation energy?

3. Define the term degree of freedom in phase rule.

4. What is the number of components for the equilibrium system?

    $$CaCO_3(S) \rightleftarrows CaO(S) + CO_2(g)$$
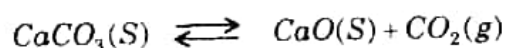
5. Define critical solution temperature.

6. Explain the principle of steam distillation.

7   What is Beer-Lambert law?

8   When CH_3COONa is hydrolysed, what would be the nature of resulting solution? acidic or basic.

9   What is ionic product of water?

10. What is the relation between change in free energy and E_{cell} ?

(10 × 1 = 10 Marks)

SECTION – B

(Short answer type. Answer any **eight** questions from the following. **Each** questions carries **two** marks)

11. Derive integrated rate equation for first order reaction.

12. Second and fourth group cations are precipitated as sulphides. Explain why fourth group cations are not precipitated along with second group ions.

13. Calculate the maximum number of phases that can co-exist in equilibrium in a

    (i)   One component system

    (ii) Two component system

14. Explain the effect of pressure on the melting point of ice.

15. What is anion reversible electrode?

16. Define liquid junction potential.

17. What is leveling effect?

18. Calculate the half life period of a first order reaction of rate constant $0.0693\,yr^{-1}$

19. Explain:

   (i)   Deliquescence

   (ii) efflorescence

20. What is wein effect?

21. What is Stark-Einstein law?

22. Explain the advantages of Fuel cells.

(8 × 2 = 16 Marks)

SECTION – C

*(Short essay type. Answer any **six** questions from the following. Each questions carries **four** marks)*

23. Explain the term common ion effect with suitable example.

24. What is distribution law. Derive it thermodynamically.

25. A buffer solution contains 0.40 mole of acetic acid 0.20 mole of sodium acetate per litre. Calculate the pH of solution.

   K_a of acetic acid $= 1.75 \times 10^{-5}$ mol L^{-1}.

26. Explain the phase diagram of sulphur system.

27. Explain the principle involved in the solvent extraction.

28. Derive the expression for ΔG and ΔH of a cell reaction.