C 60065 **(Pages : 3)** **Name**.....

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY – III

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions.*
Answer in one word **or** *sentence.*

1. pH is defined as ————————.
2. Two examples of buffer solutions are ————————.
3. Example of a sparingly soluble salt is ————————.
4. Calculate the cell constant of M/10 solution of KCl at 291 K whose specific conductance is 0.0112 S cm^{-1} and resistance when contained in conductivity cell is 55 Ohms.
5. Example of a salt of weak acid and weak base is ————————.
6. Example of a galvanic cell is ————————.
7. The distance ratio $d_{100} : d_{110} : d_{111}$ planes in case of simple cubic lattice is ————————.
8. An example each of (a) tetragonal ; and (b) triclinic systems are ————————.
9. A crystal planes makes intercepts $\frac{1}{2}a, \frac{1}{2}b$ and $\frac{3}{2}c$. What are the miller indices of the plane ?
10. The hydronium concentration of a solution having pH = 4.6990 is ————————.

(10 × 1 = 10 marks)

Section B

Answer any **ten** *questions.*
Each carries 2 marks.

11. Sketch the Calomel electrode and give the electrode reaction.
12. The solubility product of AgCl at 298 K is 1.7×10^{-10} mol^2 dm^{-6}. Calculate the solubility of AgCl.
13. What is meant by specific conductance ? How does it vary with dilution ?
14. Derive Henderson equation for Basic Buffer.
15. Discuss briefly Hydrogen-Oxygen fuel cell.

Turn over

16. Write S.N. on concentration cell without transference.
17. Discuss briefly Schottky defect.
18. Name one example each of acidic and basic buffer.
19. What is meant by ionic product of water ? What is its value at 303 K ?
20. Explain the term Wien effect.
21. Calculate the degree of hydrolysis of 0.05 M Potassium acetate in a 0.05 M aqeous solution of it at 298 K (K_a of acetic acid = 1.8×10^{-5} $K_w = 1 \times 10^{-14}$).
22. Calculate the e.m.f. at 25°C of the cell $Zn(s)\left|Zn^{+2}\,(0.1\,M)\right|\left|Ag^{+}\,(0.1\,M)\right|Ag(s)$.

    Given : $E^0Zn^{+2}\left|\,Zn = -0.76V\,;\,E^0Ag^{+}\right|Ag = 0.80V$.

(10 × 2 = 20 marks)

Section C

Answer any **five** *questions.*
Each carries 6 *marks.*

23. Define molal depression constant. Calculate the freezing point of a solution prepared by dissolving 3.42 g of Sucrose, (molar mass = 342) in 50 g of water (K_f = 1.86 K Kg mol^{-1}).
24. Explain the utility of the values of standard electrode potentials.
25. Write S.N. on Bravis lattices.
26. Discuss briefly intrinsic and extrinsic semi conductors with an example each.
27. How are liquid crystals classified ?
28. State and explain Faraday's laws.
29. Discuss briefly Electrochemical theory of corrosion of metals.
30. State and explain Kohlrausch's law and explain one of its applications.

(5 × 6 = 30 marks)

Section D

Answer any **two** *questions.*
Each carries 10 *marks.*

31. (a) Define solubility product. How is solubility and solubility product of a sparingly soluble salt determined ?

    (b) Write S.N. as liquid junction potential.

32. (a) State Henry's law. What are its applications ?

(b) Discuss briefly conductometric titration of a weak acid against strong base and strong acid against weak base. What are the advantages of conductometric titrations ?

33. (a) State and explain law of rational indices. Explain miller indices of a plane and how are miller indices obtained.

(b) Write S.W. on powder diffraction method.

34. (a) Write S.N. on Calomel electrode and quinhydrone electrode.

(b) Explain Debye-Hückel Onsager equation for strong electrolytes.

(2 × 10 = 20 marks)