Reg. No ..... Name **21U435**

B Sc DEGREE END SEMESTER EXAMINATION - JULY 2021

SEMESTER 4 : CHEMISTRY

COURSE : **19U4CPCHE4.1 : ADVANCED PHYSICAL CHEMISTRY - II**

(For Regular - 2019 Admission)

Time : Three Hours Max. Marks: 60

PART A

Answer All (1 mark each)

1. Consider elements A, B, C whose reduction potentials are -0.38V, -0.96V,+1.2V respectively. Arrange them in the increasing order of reduction potential.
2. Give one example each for an oxidising agent and reducing agent used in Redox Titrations.
3. Point out the use of H_2SO_4 in Permanganometric Titrations
4. Arrange the following electromagnetic radiations in the increasing order of wavelength: UV, X-ray, Microwave, IR
5. Give the expression for Boltzmann distribution law.
6. Which type of transition occurs along with phosphorescence?
7. What are strong electrolytes? Give an example for a strong electrolyte.
8. Give an example for a first order reaction.

(1 x 8 = 8)

PART B

Answer any 6 (2 marks each)

9. What is meant by standard electrode potential?
10. Determine EMF of the cell: $Cd,Cd^{2+}||Cu^{2+},Cu$ $E^o(Cu^{2+},Cu)=0.34V$, $E^o(Cd^{2+}, Cd)=-0.40V$
11. Determine the Oxidation state of Cr in $K_2Cr_2O_7$ and K_2CrO_4
12. Give the applications of Infra Red spectroscopy.
13. Chemiluminescence is termed as reverse photochemical reaction. Why?
14. What is cell constant? How is it determined?
15. What is the effect of dilution on specific conductance?
16. The rate of a reaction becomes thrice when the temperature changes from 293 to 323 K. Calculate the energy of activation.

(2 x 6 = 12)

PART C

Answer any 4 (5 marks each)

17. The EMF of the cell
    $Mg,Mg^{2+}||Ag^{+},Ag(0.001M)$
    At 298K is found to be 3.0134 V. Calculate the concentration of Mg^{2+}solution in the cell.
    $E^o(Mg^{2+}|Mg)$ =-2.37V and $E^o(Ag^{+}|Ag)=0.80V$
18. Describe briefly the rules with examples for assigning oxidation state for a polatomic molecule.
19. The force constant of HI molecule is 283.4 Nm^{-1}. Calculate the fundamental vibrational frequency in cm^{-1}. (Given the atomic mass in amu; H=1.008 & I=126.9).
20. Give the differences between fluorescence and phosphorescence?
21. Describe the conductometric titration of a strong acid against a weak base
22. Explain homogenous catalysis and heterogenous catalysis with suitable examples.

(5 x 4 = 20)

PART D

Answer any 2 (10 marks each)

23. a) Write a note on concentration without transference.
    b) How will you determine pH using a quinhydrone electrode?

24. Write short notes on:
    a) Chromophores b) Auxochromes c) Red shift and d) Blue shift

25. (a) What do you mean by transport number?
    (b) A solution of silver nitrate was electrolysed between silver electrodes. Before electrolysis, 10g of the solution contained 0.01788g of silver nitrate. After the experiment, 20.09 g of the anodic solution contained 0.06227g of silver nitrate. At the same time 0.009479 g of copper was deposited in copper coulometer placed in series. Calculate the transport number of silver and nitrate ions (Ag=108; Cu=63.6)

26. Give a short account of different types of catalysis.

(10 x 2 = 20)