SUBJECT CODE: 19CH/AC/FC43

B.Sc. DEGREE EXAMINATION, APRIL 2022
BRANCH III - PHYSICS
FOURTH SEMESTER

COURSE   :   ALLIED – CORE
PAPER   :   FUNDAMENTALS OF CHEMISTRY- II
TIME   :   3 HOURS   MAX. MARKS : 100

SECTION – A

Answer all the questions: **(30 x 1 = 30)**

I. Choose the correct answer:

1. According to IUPAC convention , the cell EMF can be expressed in terms of reduction potential of RHE (E_R) and LHE (E_L) as
    a) $E_{cell}= E_L- E_R$ b) $E_{cell}= E_R- E_L$ c) $E_{cell}= E_R+E_L$ d) $E_{cell}= E_R E_L$

2. Example of a bidentate ligand is _____
    a) Cyano   b) py   c) aqua   d) oxalate

3. The number of donor atoms in glycinato is _____
    a) 4   b) 3   c) 2   d) 1

4. Temperature at which standard reduction potential is measured is _____
    a) 298 K   b) 273 K   c) 268 K   d) 300 K

5. The number of molecules in 3.4 g of H_2S is _____
    a) 6.023×10^{24} b) 6.023×10^{23} c) 6.023×10^{22} d) 6.023×10^{25}

6. Reference material used in DSC is _____
    a) Al_2O_3 b) BaO c) CaO d) CeO_2

7. The thermocouple that is commonly used in TGA is made up of _____windings
    a) Ni-Cr   b) Cr-Al   c) Pt-W   d) Fe-Cr

8. For the study of polymer decompositions _____gas is used as an inert atmosphere.
    a) Argon   b) helium   c) nitrogen   d) hydrogen

9. Example of a primary cell is_____
    a) Dry cell   b) Ni-Cd cell   c) Mercury cell   d) lead storage cell
10. Equivalent weight of Na_2CO_3 is _____
    a) 53   b) 56   c) 106   d) 54

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II   Fill in the blanks:

11. The IUPAC name of $[Pt(py)_4][PtCl_4]$ is _____

12. Specific conductance _____with dilution.

13. Ostwald's dilution law is applicable for _____electolytes.

14. Structure of bipy is _____   /

15. Expansion of DSC is _____

16. Number of donor atoms in EDTA is _____

17. _____volume of 10 M HCl is diluted with water to prepare 2 L of 5 M HCl.

18. Unit of molality is _____

19. Normality and Molarity are related by the expression _____

20. Shape of $NiCO_4$ is _____

III   State whether true or false:

21. Azido is a bidentate ligand.

22. $\Delta G°$ and $nFE°_{cell}$ are related as $\Delta G° = nFE°_{cell}$

23. Electrochemical series is based on the standard reduction potential of NHE.

24. Magnetic moment is expressed in Bohr Magnetron.

25. Two types of DSC techniques are Heat flux and Power compensated.

IV   Answer in a line or two:

26. Give any one advantage of conductometric titration.

27. Draw the structure of en.

28. Define hydrate isomerism.

29. How is cell constant determined?

30. What is the function of a salt bridge?

SECTION - B

Answer any five questions: (5 x 6 = 30)

31.a) Explain mole concept.

   b) Calculate the volume of 0.6 mole of SO_2.   (4+2)

32. Describe Hydrogen-Oxygen fuel cell.

33. Discuss the salient features of VBT

34. a) What is equivalent conductance?

    b) Explain the importance of Nernst equation.   (2+4)

35. Describe the working of calomel electrode.

36. Explain the terms a) linkage isomerism   b) magnetic moment   c) ambidentate ligand
                                                                        (2+2+2)

37. a) Draw the thermogram of calcium oxalate and explain.

    b) What is the principle of DTA? Draw a DTA plot.

SECTION - C

Answer any two questions: **(2 x 20 = 40)**

31. a) State Kohlrausch's Law. Explain the varied applications of the law.

    b) The values of Λ_m^∞ for NH_4Cl, NaOH and NaCl at infinite dilution are respectively

       129.8 , 248.1 and 126.4 $ohm^{-1}cm^2mol^{-1}$. Calculate Λ_m^∞ of NH_4OH.

    c) Illustrate the applications of electrochemical series.   (10+5+5)

32. a) Discuss the principle and instrumentation of TGA.

    b) Explain the structural features and functions of Haemoglobin.

    c) Describe the working of Lead storage battery.   (8+6+6)

40. a) Desribe geometrical isomerism in four coordinate complexes.

    b) In accordance with VBT, explain the geometry of $[FeF_6]^{3-}$ (n=5) and

       $[NiCl_4]^{2-}$ (n=2).

    c) What are conductometric titrations? Describe the titration of i) a strong acid with a

       strong base and ii) a weak acid with a weak base.   (6+6+8)

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