KUMARAGURU
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Register Number: ……..

B.E / B.TECH DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2009)

First Semester

CHY101: ENGINEERING CHEMISTRY

(Common to all Branches)

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. When zinc reacts with dil.HCl, it liberates hydrogen since ----------

   a) Reduction potential of hydrogen is lesser than that of zinc electrode

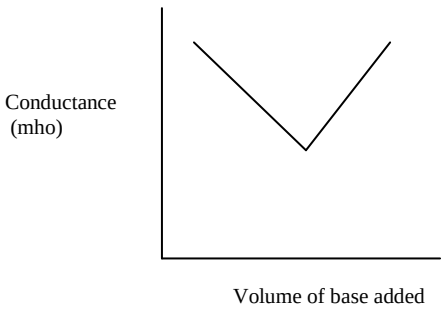
   b) Reduction potential of zinc is lesser than that of hydrogen.

   c) The reduction potentials of zinc and hydrogen are same

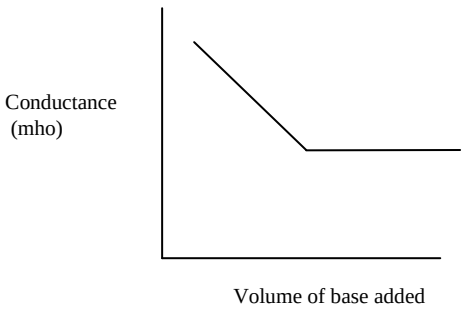
   d) The reduction potential of chlorine is greater than that of hydrogen.

2. The graphical representation of a conductometric titration between a weak base and strong acid is ----

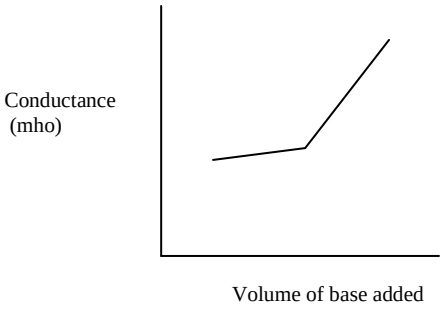
   a)



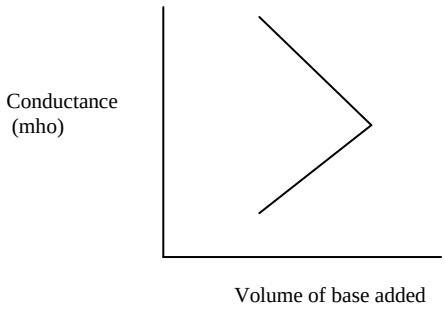
   b)



   c)



   d)



3. The cathodic material of a Leclanche cell is ----------
   a) Zinc chloride
   b) Graphite rod
   c) Zinc metal
   d) Manganese dioxide
4. A chain reaction in the nuclear fission of U -235 is due to ----------
   a) Neutrons emitted
   b) The presence of the impure U-238
   c) Protons emitted
   d) Electrons emitted
5. The internal energy change of an ideal gas expansion is ----------
   a) + 25 cals
   b) - 25 cals
   c) zero
   d) 35 cals
6. Spontaneous process involves ----------
   a) Decrease of enthalpy
   b) Increase of enthalpy
   c) Increase of free energy
   d) Decrease of free energy
7. The magnitude of chemisorptions ---------- with rise of temperature.
   a) decreases
   b) increases
   c) remains unaltered
   d) is independent
8. -------- the surface area per unit mass of adsorbent, ---------- is its capacity for its adsorption.
   a) Greater, lower
   b) Lower, greater
   c) Greater, greater
   d) Lower, zero
9. The IR spectroscopy is the study of ---------- in molecules
   a) Electronic excitation
   b) Rotational excitation
   c) Polarisability
   d) Vibrational excitation of bonds
10. According to Beer Lambert Law:
   a) $\ln I = \ln I_o + kbc$
   b) $\ln I = \ln I_o - kbc$
   c) $\ln I = \ln I_o - kb$
   d) $I = I_o + kb$

PART B (10 x 2 = 20 Marks)

11. Relate the emf of the cell with the activities of species involved in the cell reaction.
12. Redox potentials of Cu^{2+}/ Cu and N^{2+}/Ni are +0.34V and and – 0.23 V respectively. Identify the anode and cathode of the cell formed by these electrodes.
13. Distinguish primary and secondary batteries.
14. What is the negative electrode when a lead acid cell is discharging current? Write its reactions also.
15. What are isobaric and isochoric processes?
16. Define entropy of a system. Write its unit also.
17. What do you understand by adsorption and adsorption?

18. Indicate the orders of adsorption at very low pressure and very high pressure according to Langmuir adsorption isotherm.
19. Mention the components of colorimeter.
20. What is the source of the flame in the flame photometry and the sample holder?

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the electrochemical series and its significance. (7)
(ii) State Kohlrausch law of independent migration of ions. Explain any one of its applications in detail. (7)

(OR)

b) (i) Explain the concentration polarization and overvoltage taking an example. (7)
(ii) What are the different types of electrodes? Give one example each with representation. (7)

22. a) (i) Explain the construction and function of Ni- Cd cell. Give a neat sketch of it. (7)
(ii) What are the characteristics of nuclear fission? (7)

(OR)

b) (i) What is a fuel cell? In what way it is different from other electrochemical cells? What are the advantages and disadvantages of fuel cell? (7)
(ii) Write the construction and function of lead acid accumulator giving a diagram of the cell. (7)

23. a) (i) What are the different statement s of II law of thermodynamics? (7)
(ii) Derive a relation to arrive at entropy change for a reversible expansion of an ideal gas at constant pressure and temperature. (7)

(OR)

b) (i) Calculate ΔH, ΔS, ΔG and ΔE when 1 mole of water is vapourised at 100^{o} C and 1 atmosphere. The latent heat of vaporization of water is 540 cal /g.

24. a) (i) Derive Van't Hoff isotherm. (7)
(ii) Derive Vant't Hoff isochore from the relation, $\Delta G^{o}=-RT \ln K_{eq}$. At what temperature will water boil when the atmospheric pressure is 528 mm Hg. Latent heat of vapourisation of water is 545.5 cal/g (7)

(OR)

b) (i) Derive Langmuir adsorption isotherm. (7)

(ii) Explain adsorption chromatography with applications. (7)

25. a) (i) What is the role of adsorption in catalytic reactions? (7)

(ii) Derive Freundlich isotherm and its salient features. (7)

(OR)

b) (i) How will you estimate iron by colorimetry? (7)

(ii) Explain the principle involved in IR spectroscopy. (7)

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