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POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Applied Chemistry

Semester: Fall

Year : 2024
Full Marks : 100
Pass Marks : 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain and illustrate the Zn-Cu Galvanic cell. Calculate the emf of given cell at 25^0 C. Write down the cell reactions and cell notation of the cell. 8

   Fe / Fe^{2+} (a= 0.002) // Ag^+ (a=0.15) / Ag

   given that $E^0_{Fe^{2+}/Fe} = -0.440$ V and $E^0_{Ag^+/Ag} = +0.779$ V

   b) What are primary, secondary and reverse batteries? Explain it with suitable example of each. Give any three applications of electrochemical series. 7

2. a) Microbial contamination is more hazardous in compare to chemical contamination of drinking water in Nepal, justify it. Discuss different chemical pollutants in drinking water. 8

   b) Describe the process of analysis of Dissolved Oxygen (DO) in the laboratory by Winkler's method with reactions involved. What is it's significance in water? 7

   OR

   Describe the Laboratory process of analysis of Alkalinity in water. Why two indicators are used in this process?

3. a) What are transition elements? Why all d-block elements are not true transition elements? Give reasons for following 8

      i. Zn salts are always colorless

      ii. Transition elements represent variable oxidation states

   b) Why the transition elements forms colored compounds? Give the applications of transition metals in your field of engineering. 7

4. a) Name the types of reactions in organic chemistry. What are electrophile and nucleophile? How does these species form? Explain. 5

b) Give the mechanism and stereochemistry of SN1 reaction in favors of tertiary butyl bromide in presence of aqueous NaOH solution. 5

c) What is Saytzeff's rule? Give example. Write the kinetics and mechanism of dehydrohalogenation of tertiary butyl halide in favors of E1 reaction. 5

5. a) What is paint? Describe the different components of paints. 7

OR

Describe the manufacturing process of Portland cement. Why gypsum salt is added to the cement?

b) Describe the basic principle of Photo voltaic cell and it's applications in the engineering field. 8

6. a) Differentiate between addition and condensation polymer. Give preparation properties and uses of Teflon. 5

b) What are conducting and non-conducting polymers? Give example and their applications. 5

c) What is photovoltaic cell? Give the basic principle and application. 5

7. Write short notes on: **(Any two)** 2×5

a) Tri-nitro Toluene

b) Conducting and non-conducting polymers

c) Catalytic properties of transition elements