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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE UP EXAMINATION JULY 2024**

**Semester**: II

**Course Code**: CHE 101

**Course Name**: Engineering Chemistry Theory

**Program** : B.Tech

**Date**:05 JULY 2024

**Time**: 9:30 AM-12:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the question properly and answer accordingly*
2. *Question paper consists of 3 parts*
3. *Scientific and non-programmable calculators are permitted*

**Part A**

Answer any the 20 Questions. Each question carries 2 marks. (20Qx2M=40 M)

**Choose the best answer.**

1. The weight of an element or compound that will combine with or displace 8 grams of oxygen or 1.007 97 grams of hydrogen or 35.45 g of chlorine is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an element.

a) Molality b) Standard solution c) Formality d) Equivalent weight

1. Which of these is a conducting polymer?

a) Polystyrene b) Nylon c) Polyaniline d) PVC

1. Natural Rubber is a polymer of \_\_\_\_\_\_\_\_\_\_\_\_\_

a) Styrene b) Glycerine c) Isoprene d) Bakelite

1. The concentration of hardness that is always expressed in terms of equivalents of CaCO3 is called \_\_\_\_\_\_\_\_\_\_\_\_\_

a) Degree of b) Units of hardness c) Temporary hardness d) Permanent hardness hardness

1. \_\_\_\_\_\_\_\_\_\_\_\_\_ is also known as Leclanche Cell.

a) Lead-acid battery b) Alkaline battery c) Mercury cell d) Dry Cell

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for a reaction is derived directly from the free energy change for that reaction

a) Electrode potential b) EMF c) Voltage d) None of the

above

1. In bimetallic sample of iron and zinc, iron acts as\_\_\_\_\_\_\_\_\_\_.

a) Cathode b) Anode c) Metal d) Electrode

1. Cetane number is the percentage of n-cetane present in a mixture of\_\_\_\_\_\_\_.

a) Isooctane and b) Isooctane and c) n-cetane and d) n-cetane

n-heptane α-methyl naphthalene α-methyl naphthalene and n-heptane

1. The role of iron oxide in cement\_\_\_\_\_\_\_\_\_\_

a) Gives strength b) Imparts color c) Helps quick setting d) Makes cement

sounds

1. Sulphur system has \_\_\_\_\_\_\_\_\_\_ phases.

a) 3 b) 1 c) 4 d) 2

**Fill in the blanks**

1. The reaction that involves the formation of a soluble complex between the metal ion and the complexing agent is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction.
2. \_\_\_\_\_\_\_\_\_ emits water vapour and no other harmful chemicals to the environment.
3. In electroplating process article to be electroplated is made as\_\_\_\_\_\_\_\_\_\_.
4. Materials that can withstand very high temperatures, over 3000°C, without degrading or softening are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. A good fuel should have a high \_\_\_\_\_\_\_\_\_\_ value.

**State whether the given statement is True or False**

1. Replacing NH4Cl with NaOH/KOH prevents corrosion of zinc cathode in dry cell.
2. The functionality of the monomer present in polyethylene is monofunctional.
3. Coating of Sn on Fe is a cathodic coating.
4. A system with F = 2 is known as bivariant
5. Wrought iron is an example for non-ferrous alloy.
6. Removal of boiler scales CANNOT be done by
7. Thermal shocks b. Filtration c. Treating with HCl d. Scraping
8. Corrosion between the dissimilar metals is called as \_\_\_\_\_\_\_\_\_\_  
   a. Galvanic corrosion b. Dry corrosion c.Oxidation corrosion d. Concentration cell corrosion

**Part B**

**Answer any 6 Questions. Each question carries 5 marks**. (6Qx5M=30M)

1. Write any five differences between dry corrosion and wet corrosion.
2. Discuss the electroless plating of Nickel with reactions.
3. Explain the synthesis, properties ans application of Nylon 6, 6.
4. What is Desalination? Explain RO process in detail.
5. Explain fluidized bed catalytic cracking with neat diagram.
6. What are batteries? Discuss the classification of batteries with examples.
7. Explain Electroplating of Chromium

**Part C**

**Answer any 2 Questions. Each question carries 10 marks.** (2Qx15M=30M)

1. Calculate the Total hardness, Temporary Hardness and Permanent hardness of a

water sample containing the following: Mg(HCO3)2 : 10.5 mg/L ; MgSO4 : 4.8 mg/L ;

MgCl2 : 3.9 mg/L ; CaSO4 : 10.4 mg/L ; Ca(HCO3)2 : 9.2 mg/L.

**(Atomic Weights: Ca: 40, Mg: 24, H: 1, C: 12, O:16, S: 32, Cl: 35.5, N: 14)**

1. Describe the stages involved in the manufacture of cement with reactions.
2. A sample of Polypropylene polymer manufactured in a polymer industry was found to have, 20% with molecular mass 1600 g/mol, 30% with molecular mass 2100 g/mol and rest with molecular mass 2500 g/mol. From the above data, what will be the number average molecular mass and weight average molecular mass?
3. What are fuel cells? Discuss the construction, working and applications of H2 - O2  fuel cell.