

I B.Tech Supplementary Examinations, November/December 2005**APPLIED CHEMISTRY****(Civil Engineering)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the various corrosion reactions taking place at anodic and at cathodic areas during the evolution of hydrogen type of corrosion and absorption of oxygen type of corrosion. [16]
2. (a) What is the process for chromium plating? Explain the main objectives and uses. Give reasons why chromium plating has nickel undercoat. [10]
(b) Write a brief account on sherardizing. [6]
3. (a) What is meant by chemical conversion coatings? What are their functions?[8]
(b) Explain the composition, method of coating and functions of aluminium coatings. [8]
4. (a) Differentiate between thermoplastics and thermoset plastic materials. [8]
(b) Outline the preparation, properties and uses of PVC. [8]
5. (a) Explain the processes of priming and foaming in boilers. [7]
(b) How can these be avoided ? [4]
(c) Describe the hot lime-soda process for softening of hard water. [5]
6. (a) Describe the EDTA method to determine the calcium hardness of water. [11]
(b) Calculate the hardness of a $CaCl_2$ solution which is 0.1 M in concentration. [5]
7. (a) Write notes on: [8]-
 - i. magnesible bricks
 - ii. chromite bricks.
(b) How do you classify insulators ? Explain your answer with appropriate examples. [8]
8. (a) Give an account of the functions of the ingredients of cement. [6]
(b) How is Portland cement manufactured by dry process? [10]

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1. Explain what happens and why it happens
 - (a) When a zinc article is under strain [4]
 - (b) When iron sheets riveted with copper rivets [4]
 - (c) when an iron pole is partly buried under soil [4]
 - (d) When a metallic structure is buried under mineralized soils. [4]
2. Compare and contrast the following methods with suitable examples
 - (a) Galvanizing with tinning [6]
 - (b) Metal spraying with metal cladding [6]
 - (c) Iodine number [4]
3. (a) What are distempers? Give an account of the composition, advantages, disadvantages and uses of the distempers. [10]
(b) Write short notes on drying oils. [6]
4. (a) What is Crepe rubber and how is it made ? [8]
(b) Describe the preparation, properties and uses of
 - i. Thiokol rubber [6]
 - ii. Neoprene rubber [5]
5. (a) Describe a method for estimating temporary hardness of water using Hehner's procedure. [8]
(b) Outline the EDTA method for determining the permanent hardness of water. [8]
6. (a) What is bleaching powder ? How is it useful in removal of micro-organisms from water ? [5]
(b) What are the drawbacks of using bleaching powder ? [5]
(c) Determine the total hardness of a sample of water in $^{\circ}Fr$ and $^{\circ}Clarke$ which showed the following analysis: [7]
 $MgCl_2 = 19 \text{ ppm}$; $MgSO_4 = 12 \text{ ppm}$; $Ca(NO_3)_2 = 16.4 \text{ ppm}$; $NaOH = 40 \text{ ppm}$;
 $KOH = 56 \text{ ppm}$; suspended matter = 100 ppm; $Ca(HCO_3)_2 = 16.2 \text{ ppm}$.
7. (a) Describe the different types of refractories with examples. [10]

- (b) What is Refractory-Under-Load (RUL) test ? How is it carried out ? What is the use of this test ? [6]
8. Give an account of the raw materials use din the manufacture of the lime and explain the manufacture of lime and explain the manufacture of fat lime. [16]

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1. (a) What is meant by stress corrosion? What are its characteristics? [8]
(b) Explain season cracking and caustic embrittlement. How is it prevented? [8]
2. (a) (a) Give a brief account of cathodic protection method of preventing corrosion. [8]
(b) Write a brief account on anodic coatings. [8]
3. (a) Why is anodizing best suited for aluminium? [5]
(b) How will you differentiate a paint from varnish and lacquers? [11]
4. (a) What is the difference between addition and condensation polymerization? Explain your answer with suitable examples. [9]
(b) Write a note on the structure, manufacture and uses of nylon(6). [7]
5. (a) Define hardness of water. What are the types of hardness present in water.[6]
(b) Name the different units of hardness and explain their interconversion. [5]
(c) What are the disadvantages of hard water when used for steam generation in boilers. [5]
6. (a) Explain the difference between sterilization of drinking water using Ozone and Chlorine. [8]
(b) Calculate the total hardness of a sample of water in $^{\circ}\text{Fr}$ and $^{\circ}\text{Clarke}$ having the following component:
 $\text{KCl} = 7.45 \text{ ppm}$; $\text{CaSO}_4 = 13.6 \text{ ppm}$;
 $\text{Mg}(\text{HCO}_3)_2 = 14.6 \text{ ppm}$; $\text{NaOH} = 4.0 \text{ ppm}$;
suspended matter = 10 ppm; $\text{MgCl}_2 = 9.5 \text{ ppm}$. [8]
7. (a) Classify refractories giving suitable examples. [6]
(b) Explain the importance of various gaseous insulators. [4]
(c) Write briefly on liquid insulating materials. [6]
8. How do you analyze the following during the analysis of cement?
(a) Calcium Oxide [8]
(b) Iron Oxide [8]

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1. (a) What is meant by critical humidity? Explain how humidity of the air is the deciding factor in atmospheric corrosion. [8]
(b) Give an account of the corrosion occurs due to the formation of oxygen concentration cell. [8]
2. (a) (a) Give a brief account of cathodic protection method of preventing corrosion. [8]
(b) Write a brief account on anodic coatings. [8]
3. (a) Distinguish between oil varnish and spirit varnish. [10]
(b) Mention the industrial applications of anodizing. [6]
4. (a) Write briefly on compounding and fabrication of plastics. [9]
(b) Describe the preparation, properties and uses of [7]
 - i. Plasticised PVC and
 - ii. Unplasticised PVC
5. (a) What are the important source of water ? [6]
(b) What is the cause for alkalinity of natural waters. [4]
(c) Describe the Zeolite process for softening of hard water. [6]
6. (a) Summarize the important aspects of purification of drinking water. [8]
(b) Calculate the quantities in kgs of lime and soda needed to soften 30,000 litres of water having the following composition:- [8]
NaCl = 5.85 ppm; suspended matter = 28.5 ppm; $Mg(NO_3)_2$ = 14.8 ppm;
 $CaSO_4$ = 13.6 ppm; $Ca(HCO_3)_2$ = 16.2 ppm; $Mg(HCO_3)_2$ = 14.6 ppm; Organic matter = 12.5 ppm.
7. (a) Describe the different types of refractories with examples. [10]
(b) What is Refractory-Under-Load (RUL) test ? How is it carried out ? What is the use of this test ? [6]
8. (a) Define setting and hardening of cement. [6]
(b) With the help of sequence of chemical reactions explain the setting and hardening of cement. [10]
