

II B.Tech I Semester Supplementary Examinations, November 2006

APPLIED CHEMISTRY AND BIO-CHEMISTRY

(Bio-Medical Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Explain the terms:
 - i. Specific Conductance and
 - ii. Equivalent conductance.(b) Describe an experimental method to determine the equivalent conductance of an electrolyte. [16]
2. (a) What are the properties of unplasticized PVC? What changes occur in it on plasticization?
(b) How is Teflon manufactured? What are its applications? [16]
3. (a) What is a lubricant? How are lubricants classified? Give Examples.
(b) Give, with examples, the mechanism of
 - i. Hydrodynamic
 - ii. Boundary lubrication. [16]
4. (a) What are the methods for determination of hardness of water? Explain complexometric method for determination of hardness.
(b) How do you estimate free chlorine and alkalinity of water? Explain. [16]
5. (a) What are the differences in the cell wall composition of plant animal cells?
(b) Explain the behaviour of membrane lipids in homoeothermic and poikilothermic organisms. [16]
6. What is an enzyme? What is its chemical nature? Explain how the enzymes accelerate reactions. [16]
7. (a) Describe embden Myerhof pathway and it's significance.
(b) Write short notes on:
 - i. Glycogenolysis
 - ii. Glycogenesis. [16]
8. Explain how plasma proteins contribute for maintaining acid base balance and add a note on the biochemical measurements of acid base status. [16]

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1. (a) Define electrochemical cell. How a galvanic cell functions. Explain Daniel cell with a neat diagram and chemical reactions involved in it.
(b) Resistance of a conductivity was found to be 200ohms and 250ohms. When filled separately with 0.1N kcl solution and given 0.01N electrolyte solution respectively. Calculate the equivalent conductivity of the given electrolyte when the specific conductivity of 0.1N KCL solution is $0.0129\text{mhos.cm}^{-1}$. [16]
2. (a) What is rubber? What is its chemical composition?
(b) How is raw rubber obtained from latex? [16]
3. Explain the following properties of lubricants and discuss their significance.
(a) Viscosity
(b) Viscosity index
(c) Flash Point
(d) Oiliness. [16]
4. (a) What do you understand by the term hardness' of a sample of water? Define the degree of hardness and discuss the various units of its Expression.
(b) Distinguish between carbonate hardness and non-carbonate hardness of a sample of water.
(c) Calculate the temporary and permanent hardness of water, in ppm units, which analysis as follows:

Magnesium bicarbonate	...	73 mg/L
Calcium bicarbonate	...	162 mg/L
Calcium sulphate	...	136 mg/L
Magnesium Chloride	...	95 mg/L
Calcium Chloride	...	111 mg/L
Sodium Chloride	...	100 mg/L

 [16]
5. What is the composition of all membranes? Explain fluid mosaic model of plasma membrane and chemical and physical properties of the components in it. [16]
6. (a) What are isoenzymes? Explain with suitable examples.
(b) Explain the allosteric effects in enzyme catalysed reactions. [16]

7. Describe the formation and fate of acetyl co A. [16]
8. (a) Enumerate the chemical composition of urine.
(b) Highlight the clinical significance of urine analysis in diseases. [16]

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1. (a) What are electrode potentials? How are they useful?
(b) Write briefly on the glass electrode.
(c) If $E^\circ_{Cu^{+2}/Cu} = 0.34$ Volt and $E^\circ_{Fe/Fe^{+2}} = 0.4$ Volt, Calculate the standard emf for the cell, $Fe/Fe^{+2} || Cu^{+2}/Cu$. [16]
2. (a) Describe the preparation, properties and uses of Teflon.
(b) What is PVC? Explain the difference between plasticized PVC and unplasticized PVC. How are they manufactured? [16]
3. Explain the following properties of lubricants and discuss their significance.
(a) Viscosity
(b) Viscosity index
(c) Flash Point
(d) Oiliness. [16]
4. Write short notes of the following.
(a) Break point chlorination
(b) Estimation of free chlorine
(c) Dissolved oxygen determination
(d) Zeolites. [16]
5. (a) Define cell. How many types of cells are there? Name them. [1+1+2]
(b) Give suitable examples for each. [2]
(c) Name the important organelles of the cell. Explain the centrifugal separation of cell organelles and main functions of the cell. [10]
6. (a) Explain the "Lock and Key" functioning of enzymes in biological reactions.
(b) How an enzyme is isolated and purified from a living organism? [8+8]
7. (a) Differentiate between simple diffusion and facilitated transport across biological membranes giving examples.
(b) Write briefly on: [16]

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Set No. 3

- i. channels
- ii. Ionophores.

8. Write short notes on:

- (a) Inorganic constituents of blood
- (b) Transaminases
- (c) Glucosuria.

[16]

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1. (a) Explain the terms:
 - i. Specific Conductance and
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2. Write notes on the following:
 - (a) PVC
 - (b) Natural Rubber. [16]
3. Distinguish between:
 - (a) Flash point and cloud point.
 - (b) Petroleum and synthetic lubricants.
 - (c) Fluid film and boundary lubrication. [16]
4. (a) What are the different methods of expression of units of hardness? And explain different types of hardness of water.
(b) Explain Lime-Soda method of treatment for removing hardness of water. [16]
5. Explain facilitated diffusion and active transport of metabolites across bio-membranes and what are the differences between them. [16]
6. (a) What are isoenzymes? Explain with suitable examples.
(b) Explain the allosteric effects in enzyme catalysed reactions. [16]
7. List the excretory products of metabolism. Describe how they are formed in the body. [16]
8. (a) Write a detailed anay on the composition of blood.
(b) Illustrate the major blood cells with suitable diagram. [16]
