COMBINED FIRST AND SECOND SEMESTER B. TECH DEGREE EXAMINATION, APRIL 2014

SUBJECT :EN 09 104- ENGINEERING CHEMISTRY

(2009 Scheme)

Time : 3 Hours Maximum Marks : 70

**Part – A**

*Answer all the questions. Each question carries 2 Marks (5 X 2 = 10 Marks)*

1. What are liquid crystal polymers. Give one example.
2. What do you mean by break point chlorination
3. Define flash point and fire point of a lubricating oil
4. What is meant by electrochemical series. What is its importance
5. What is stressCorrosion.

**Part - B**

*Answer any four questions, Each question carries 5 Marks ( 4 X 5 = 20 Marks )*

1. What are Carbon nanotubes. Give any four applications of it
2. Give an account of the various steps involved in the free radical mechanism for addition polymerization of a vinyl compound
3. Write briefly on compounding of rubber
4. What is M / M+ type electrode. Explain the working of such an electrode with a suitable example
5. What is the basic principle involved in the cathodic protection methods for control of corrosion. Explain the sacrificial anodic protection method
6. What is BOD. Write briefly the experimental procedure for the determination of BOD

**Part -C**

*Answer (a) or (b) of each questions. Each question carries 10 Marks( 4 X 10 Marks = 40 )*

1. **(a)** What is band theory for conductivity in solids. Explain the conductivity in n-type and p-type semiconductors based on the theory (10)

**OR**

**(b)**Describe the principle and procedure involved in the estimation of different types Of hardness present in a water sample. (10)

1. **(a)**What do you mean by ionic polymerization? Explain with relevant reactions.

(10)

**OR**

**(b)** Give a detailed note on theories of mechanism of lubrication. (10)

1. **(a)** (i) What is a salt bridge. What is its significance (3)

(ii)What is glass electrode. Explain the determination of pH using glass electrode (7)

**OR**

**(b)**Explain (i) The construction and working of a Nickel- Cadmium storage cell

**(5)**

(ii) The mechanism of buffering action of a Basic buffer (5)

1. **(a)** What are paints . Give an account of the various constituents and their function in a paint with examples (10)

**OR**

**(b)**Give an account of different metallic coatings used for corrosion control (10)

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Scheme of Evaluation

**Part – A**

*Each question carries 2 Marks (5 X 2 = 10 Marks)*

1. What are liquid crystal polymers. Give one example.

**Definition – 1 Mark**

**Any one example (Aramid fibres / Polymethyl methacrylates) – 1 Mark**

1. What do you mean by break point chlorination

**Break point Chlorination- Definition (a stage in the chlorination beyond which free residual chlorine starts appearing in the treated water) - 2 Marks**

1. Define flash point and fire point of a lubricating oil

**Flash Point – the temperature at which oil produces enough vapours to ignite for a moment when flame is shown above it - 1 Mark**

**Fire Point – – the temperature at which oil produces enough vapours to ignite continuously for about 5 secs when flame is shown above it -1 Mark**

1. What is meant by electrochemical series. What is its importance

**Electrochemical series definition – arrangements of metals in the increasing order of reduction potential -1 Mark**

**Importance or its significance – -1 Mark**

1. What is stress Corrosion.

**A type of electrochemical corrosion – due to the combined effect of an internal stress in the metal and corrosive environment - 2 Marks**

**Part - B**

*Answer any four questions, Each question carries 5 Marks ( 4 X 5 = 20 Marks )*

1. What are Carbon nanotubes. Give any four applications of it

**Carbon Nano tubes definition / explanation of structure – 1 Mark**

**Any four applications – 1 Mark each**

1. Give an account of the various steps involved in the free radical mechanism for addition polymerization of a vinyl compound

**Addition polymerization explanation / definition – 1 Mark**

**Initiation step reactions – 2 Marks**

**Propagation step - 1 Mark**

**Termination step - 1 Mark**

1. Write briefly on compounding of rubber

**Definition – Mixing of various ingredients along with raw rubber – 2 Mark**

**Any three ingredients mixed with rubber and their functions - 3 Marks**

1. What is M / M+ - type electrode. Explain the working of such an electrode with a suitable example

**General explanation of the** M / M+ **type of electrode – 2 Marks**

**Example – Cu / Cu 2+, construction of such an electrode, electrode potential equation for such an electrode – 3 Marks**

1. What is the basic principle involved in the cathodic protection methods for control of corrosion. Explain the sacrificial anodic protection method

**Principle behingCathodic protection- 2 Marks**

**Sacrificial anodic protection – explanation- 3 Marks**

1. What is BOD. Write briefly the experimental procedure for the determination of BOD

**BOD – Definition -2 Marks**

**Experimental determination – 3 Marks**

**Part -C**

*Answer (a) or (b) of each questions. Each question carries 10 Marks ( 4 X 10 Marks = 40 )*

1. **(a)** What is band theory for conductivity in solids. Explain the conductivity in n-type and p-type semiconductors based on the theory

**Band theory main points- 4 Marks**

**Band theory applied in the intrinsic semiconductors- 2 Marks**

**Band theory applied in extrinsic semi conductors, n type - 2 Marks**

**P type – 2 Marks**

**OR**

**(b)**Describe the principle and procedure involved in the estimation of different types of hardness present in a water sample.

**Basic Principle of estimation of hardness by EDTA method with reactions -**

**- 4 Marks**

**Experiment– standardization of EDTA - 1 Mark**

**Determination of total hardness - 2 Marks**

**Determination of Permanent hardness – 2 Marks**

**Calculation of Temporary hardness- 1 Mark**

1. **(a)**What do you mean by ionic polymerization?Explain with relevant reactions.

**Introduction on ionic polymerization - 1 Mark**

**Types - 1 Mark**

**Cationic polymerisation with reactions 4 Marks**

**Anionic polymerization 4 Marks**

**OR**

**(b)** Givea detailed note on theories of mechanism of lubrication.

**Explanation of What are lubricants -1 Mark**

**Three mechanisms**

**Thick film lubrication, 3 Marks**

**Thin film lubrication, 3 Marks**

**Exteme pressure lubrication 3 Marks**

1. **(a)** (i) What is a salt bridge. What is its significance

**Explanation of contruction of salt bridge and its role in cell**

**– 2 Marks**

(ii) What is glass electrode. Explain the determination of pH using glass electrode

**Glass electrode construction – 2 Marks**

**Experimental determination of pH explanation with diagram and equation**

**– 6 Marks**

**OR**

**(b)**Explain (i) The construction and working of a Nickel- Cadmium storage cell

**Explanation/construction of Nickel – Cadmium cell - 3 Marks**

**Reactions - 2 Marks**

(ii) The mechanism of buffering action of a Basic buffer

**Explanation - 3 Marks**

**Reactions - 2 Marks**

1. **(a)** What are paints . Give an account of the various constituents and their function in a

paint with examples

**Paints explanation - 3 Marks**

**7 constituents with their functions and one example each – 7 Marks**

**OR**

**(b)**Give an account of different metallic coatings used for corrosion control

**Explanations on Galvanising- 2.5 Marks**

**Tinning 2.5 Marks**

**Cementation (Diffusion coating) 2.5 Marks Electroplating 2.5 Marks**