



Maharaja Education Trust (R), Mysuru  
**MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE**  
 An Autonomous Institute, affiliated Visvesvaraya Technological University, Belagavi  
 Belawadi, Srirangapatna Taluk, Mandya – 571 477  
 Approved by AICTE, New Delhi [Recognized by Govt. of Karnataka]



**First Semester B.E Degree Examination, February/March 2024**  
**Applied Chemistry for CSE Stream**

Duration: 3 hrs

Max. Marks: 100

- Note: 1. Answer five full questions choosing one complete question from each module.  
 2. Formula Hand Book is permitted  
 3. M: Marks, L: Bloom's level, CO: Course outcomes.

Sl. No.	Questions	Marks	CO	L
<b>Module 1</b>				
1 a)	Define electrochemical sensors? Illustrate the principle and working of electrochemical sensors and mention the applications of electrochemical sensors.	07	1	L1,L2
1b)	Discuss the principle, working and applications of conductometric sensors.	06	3	L2
1c)	What is a secondary battery? Explain the construction and working of Na-Ion battery.	07	2	L2
<b>OR</b>				
2 a)	Define a battery. Give the classification of batteries with examples.	07	1	L1,L2
2b)	Discuss the working principle of electrochemical gas sensors for the detection of SO <sub>x</sub> and NO <sub>x</sub> .	06	3	L2
2c)	Write the properties and applications of Quantum Dot Sensitized Solar Cell (QDSSC).	07	2	L2
<b>Module 2</b>				
3 a)	Mention any three properties and applications of QLED.	06	1	L2
3b)	Mention any four properties and applications of light emitting materials – poly [9-vinylcarbazole] (PVK)] suitable for optoelectronic devices.	08	2	L2
3c)	What are memory devices? Describe the classification of electronic memory devices with examples.	06	1	L2
<b>OR</b>				
4 a)	Write any three properties and applications of silicon nano crystals for optoelectronic devices.	06	1	L2
4b)	Explain the types of organic memory devices by taking p- type and n-type semiconducting materials.	08	2	L2
4c)	Describe the classification of liquid crystals. Mention any two properties and applications of liquid crystals.	06	1	L2
<b>Module 3</b>				
5 a)	With the application of electrochemical theory, explain the corrosion in iron.	07	3	L3
5b)	Briefly explain the principle, instrumentation and working of	06	4	L2



	potentiometry taking estimation of iron as an example.			
5c)	What are concentration cells? The Emf of the cell $\text{Ag}/\text{AgNO}_3(0.05\text{M}) // \text{AgNO}_3(x\text{M}) / \text{Ag}$ is 0.056 V at 298K. Write the cell representation, cell reactions and calculate the value of x.	07	2	L1,L3
<b>OR</b>				
6 a)	A thick brass sheet of area 300 inch <sup>2</sup> is exposed to moist air. After 1 year it was found to experience a weight loss 350 g due to corrosion. If the density of brass is 8.73 g/cm <sup>3</sup> . Calculate CPR in mpy and mmpy.	07	3	L3
6b)	Explain the principle, instrumentation and working of conductometry taking estimation of weak acid using a strong base as an example.	06	4	L2
6c)	What are reference electrodes? Explain the construction, working and application of calomel electrode.	07	2	L1,L3
<b>Module 4</b>				
7a)	Explain the preparation and mention any two properties, along with its commercial applications of Kevlar.	06	2	L2
7b)	In a sample of a polymer, 20% molecules have molecular mass 1500 g/mol, 35% molecules have molecular mass 2500 g/mol, and remaining molecules have molecular mass 2000 g/mol, calculate the number average, weight average molecular mass of the polymer and calculate PDI.	06	2	L3
7c)	Explain the construction and working of PV cell. Mention its advantages and disadvantages.	08	1	L2
<b>OR</b>				
8 a)	Mention any three properties, and commercial applications of graphene oxide.	06	2	L2
8b)	Elaborate the conduction mechanism in polyacetylene through oxidative doping method.	06	2	L3
8c)	Describe the generation of hydrogen by alkaline water electrolysis with a neat labeled diagram.	08	1	L2
<b>Module 5</b>				
9a)	Explain the sources and composition of e-waste.	06	1	L2
9b)	Write a brief note on role of any three stakeholders. (For example: producers, consumers, recyclers and statutory bodies).	06	1	L2
9c)	Explain the following: (i) Pyrometallurgy (ii) Hydrometallurgy	08	2	L3
<b>OR</b>				
10a)	Describe the steps involved in the extraction of gold from e-waste.	06	1	L2
10b)	Briefly discuss the various steps involved in recycling of e-waste.	06	1	L2
10c)	Explain the ill effects of toxic materials used in manufacturing electrical and electronic products.	08	2	L3

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