

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

1BCHEE102/202

First / Second Semester B.E. Degree Examinations, July 2026

APPLIED CHEMISTRY FOR ELECTRONICS & ELECTRICAL STREAM**(ECE & EEE)**

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE Full Question from each Module

2. Formula Handbook is permitted

3. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBT:CO: PI)</u>
<u>Module-1</u>			
1.	a. Explain construction and working of organic photovoltaics - Poly (3-hexylthiophene) (P3HT) as a donor and Phenyl- C61-butyric acid methyl ester (PCBM) as an acceptor, and applications.	06	(2 :1: 1.2.1)
	b. Explain construction and working of lithium-ion battery and its applications.	06	(2 :1: 1.2.1)
	c. Explain construction, working and applications of Methanol-O ₂ fuel cell.	08	(2 :1: 1.2.1)
(OR)			
2.	a. Mention the difference between organic and inorganic semiconductors.	06	(2 :1: 1.2.1)
	b. Explain any two characteristics of batteries.	06	(2 :1: 1.2.1)
	c. Explain construction, working, advantages, and disadvantages of Photo-Voltaic cell (PV cell).	08	(2 :1: 1.2.1)
<u>Module-2</u>			
3.	a. Explain synthesis and properties of Graphene Quantum Dots using citric acid method.	06	(2 :2: 1.2.1)
	b. Explain synthesis of CdSe Quantum Dots by hot injection method and applications in optoelectronic devices.	06	(2 :2: 1.2.1)
	c. Explain synthesis of TiO ₂ nanoparticles by sol-gel method.	08	(2 :2: 1.2.1)
(OR)			
4.	a. Explain optical and electronic properties of Quantum Dots (QDs).	06	(2 :2: 1.2.1)
	b. Explain Quantum Dot-based copper conductive ink by wet chemical reduction method.	06	(2 :2: 1.2.1)
	c. Explain construction, working principle, properties and applications of Quantum Light Emitting Diodes (QLEDs).	08	(2 :2: 1.2.1)
<u>Module-3</u>			
5.	a. Explain synthesis, properties and applications of PDMS (Polydimethylsiloxane).	06	(2 :3: 1.2.1)
	b. Explain synthesis, and conduction mechanism of polyaniline.	06	(2 :3: 1.2.1)

Note: (RBT: - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

	c.	A polymer sample consisting of 1, 2, 3, 4 polymer chains of molecular weights of 1000, 2000 3000, and 4000, respectively. Calculate number average and weight average molecular weight of the polymer.	08	(3 :3: 1.2.1)
		(OR)		
6.	a.	Explain synthesis properties and applications of Polyvinylidene Fluoride (PVDF).	06	(2 :3: 1.2.1)
	b.	Explain synthesis properties and applications of epoxy resin.	06	(2 :3: 1.2.1)
	c.	Calculate number average and weight average molecular weight of the polymer sample consisting of 1, 3, 5 and 7 molecules having molecular weight 1×10^5 , 3×10^5 , 5×10^5 and 7×10^5 respectively.	08	(3 :3: 1.2.1)
		Module-4		
7.	a.	Explain construction and working of calomel electrode.	06	(2 :4: 1.2.1)
	b.	Explain instrumentation of colorimetric sensors and its application in the estimation of copper in PCBs.	06	(2 :4: 1.2.1)
	c.	Emf of the cell $\text{Cu}/\text{Cu}^{2+}(0.01\text{M}) // \text{Cu}^{2+}(x\text{M}) / \text{Cu}$ is 0.0295 V at 298K. Write the cell reactions and calculate the value of x .	08	(3 :4: 1.2.1)
		(OR)		
8.	a.	Discuss various types of electrodes.	06	(2 :4: 1.2.1)
	b.	Explain instrumentation of potentiometric sensors and its applications in the estimation of iron in steel.	06	(2 :4: 1.2.1)
	c.	Define concentration cell. A concentration cell is constructed by immersing two silver electrodes immersed in silver nitrate solution of concentration 0.05 M and 0.2 M at 298 K. Write the cell representation, cell reaction and calculate the EMF of the cell.	08	(3 :4: 1.2.1)
		Module-5		
9.	a.	Define electroplating. Explain electroplating of hard and decorative chromium.	06	(2 :5: 1.2.1)
	b.	Explain the difference between electroplating & electroless plating.	06	(2 :5: 1.2.1)
	c.	Define corrosion. Analyze the electrochemical theory of corrosion taking iron as an example.	08	(3 :5: 1.2.1)
		(OR)		
10.	a.	Define galvanization. Describe galvanizing of Iron.	06	(2 :5: 1.2.1)
	b.	Explain extraction of gold from e-waste.	06	(2 :5: 1.2.1)
	c.	Define corrosion. Calculate CPR in both mpy and mm/yr for the thick steel sheet of area 240 inches square which experiences a weight loss of 4.4 kg after one year. The density of the steel sheet is 7.8 g/cm^3 . Given K for mmy and mpy are 87.6 and 534 respectively	08	(3 :5: 1.2.1)
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