

CBCS SCHEME

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1BCHEE102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026

Applied Chemistry for Emerging Electronics and Futuristic Devices (EEE, ECE)

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks, L: Bloom's level, C: Course outcomes.

3. VTU Formula Hand Book is permitted.

Module – 1			M	L	C
Q.1	a.	Explain working principle of poly (3-hexylthiophene (P3HT) as a donor and Phenyl-C61-butyric acid methyl ester (PCBM) as an acceptor?	7	L2	CO1
	b.	Explain characteristics of battery i) capacity ii) cycle life iii) shelf life	6	L2	CO1
	c.	Explain construction and working principle of solar photovoltaic cell?	7	L2	CO1
OR					
Q.2	a.	Explain construction and working of ultra-small asymmetric super capacitor?	7	L2	CO1
	b.	Explain construction and working of Li-ion battery?	7	L3	CO1
	c.	Explain differences between organic and inorganic semiconductors?	6	L2	CO1
Module – 2					
Q.3	a.	Explain synthesis of TiO ₂ nanoparticles by sol-gel method and its uses in sensor applications?	7	L3	CO2
	b.	Explain synthesis and properties of silicon based quantum dots by sol-gel method?	7	L3	CO2
	c.	Explain size dependent properties of nanomaterials i) surface area ii) optical iii) electrical properties?	6	L2	CO2
OR					
Q.4	a.	Explain synthesis and properties of graphene quantum dots using citric acid method and its applications in emerging electronics?	7	L2	CO2
	b.	Explain synthesis and properties of chitosan-carbon quantum dots hydrogel and its applications in next generation flexible and wearable electronics?	7	L2	CO2
	c.	Explain optical and electrical properties of quantum dots?	6	L2	CO2
Module – 3					
Q.5	a.	Explain synthesis and conduction mechanism of polyaniline?	7	L2	CO3
	b.	Discuss synthesis and properties of Kevlar fiber reinforced polymer for smart electronic devices applications?	7	L2	CO3
	c.	A polymer sample containing 50, 100 & 150 molecules have molecular mass 1000, 2000 and 3000 respectively? Calculate number and weight average molecular weights of polymer?	6	L2	CO3
1 of 2					

OR

Q.6	a.	What are polymer composites? Explain synthesis and properties of epoxy resin magnetic (Fe_3O_4) composite from ultra-sonic method?	7	L2	CO3
	b.	Explain synthesis, properties of PDMS (polydimethylsiloxane) and its uses in e-skin (electronic skin)?	7	L2	CO3
	c.	Discuss principle and working lithography for micro-patterned copper deposition?	6	L2	CO3

Module – 4

Q.7	a.	Explain construction working and applications of calomel electrode?	7	L2	CO4
	b.	Explain construction and working of glass electrode?	7	L2	CO4
	c.	Explain principle and instrumentation of colorimetric sensor?	6	L2	CO4

OR

Q.8	a.	Explain instrumentation and application of potentiometric sensor in the estimation of iron in steel?	6	L2	CO4
	b.	A concentration cell is constructed by combining two silver electrodes in AgNO_3 solution of concentration 0.5M & 0.2M at 298K. Write cell representation, cell reaction and calculate EMF?	7	L2	CO4
	c.	Explain instrumentation and application of conductometric sensor in the estimation of acid mixture in the sample?	7	L2	CO4

Module – 5

Q.9	a.	Explain sources and need of e-waste management?	6	L1	CO5
	b.	Explain electrochemical theory of corrosion by taking iron as an example?	7	L2	CO5
	c.	Explain the process of galvanization?	7	L2	CO5

OR

Q.10	a.	Explain the process of anodization?	7	L2	CO5
	b.	Explain the extraction of gold by bioleaching method from e-waste?	6	L2	CO5
	c.	Explain electroless plating of copper on PCBs?	7	L3	CO5

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