

**First/Second Semester B.E./B.Tech. Degree Examination, June/July 2024**  
**Applied Chemistry for CSE Stream**

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
 2. VTU Formula Hand Book is permitted.  
 3. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	What are electrochemical sensors? Explain the principle and working of electrochemical sensor.	07	L1	CO1
	b.	Explain the principle, working and any two applications of optical sensor.	06	L1	CO1
	c.	What is Quantum Dot sensitized solar cell? Explain the construction and working of Quantum Dot sensitized solar cell.	07	L1	CO1
<b>OR</b>					
Q.2	a.	Explain the detection of bio-molecule ascorbic acid using disposable sensor and also write the electro oxidation reaction.	07	L1	CO1
	b.	Explain the working principle of electrochemical gas sensors for the detection of SO <sub>x</sub> and NO <sub>x</sub> .	06	L1	CO1
	c.	Explain the construction and working of Li-ion battery. Mention any two applications.	07	L1	CO1
<b>Module – 2</b>					
Q.3	a.	What are memory devices? Explain the classification of electronic memory devices.	07	L2	CO2
	b.	Define optoelectronic device. Explain the working principle of optoelectronic device.	06	L2	CO2
	c.	What are liquid crystals? Explain the classification of liquid crystals.	07	L2	CO2
<b>OR</b>					
Q.4	a.	Explain the types of organic memory devices by talking p-type and n-type semiconducting materials.	07	L2	CO2
	b.	Explain any three properties and applications of polythiophene (P3HT) suitable for optoelectronic devices.	06	L2	CO2
	c.	What is QLED? Mention any three properties and applications of QLED.	07	L2	CO2
<b>Module – 3</b>					
Q.5	a.	Define metallic corrosion. Explain electrochemical theory of corrosion.	07	L3	CO3
	b.	A thick steel sheet of area 400 in <sup>2</sup> is exposed to moist air. After 2 years of period, it was found to experience a weight lost of 375g due to corrosion if the density of steel is 7.9 g/cm <sup>3</sup> , calculate CPR in mpy and mmpy.	06	L1	CO3
	c.	What are reference electrodes? Explain the construction, working and applications of calomel electrode.	07	L1	CO3
<b>OR</b>					
Q.6	a.	What is galvanization? Explain galvanization of Iron. Mention its applications.	07	L1	CO3
	b.	What are concentration cells? Calculate the cell potential of the following cell at 298 K. $\text{Ag}   \text{AgNO}_3(0.005\text{M})    \text{AgNO}_3(0.5\text{M})   \text{Ag}$	06	L1	CO3
	c.	Explain the principle and instruction of conductometry taking estimation of weak acid using a strong base as an example.	07	L2	CO3

**Module – 4**

Q.7	a.	In a sample of a polymer 20% molecules have molecular mass 15,000g/mol. 35% molecules have molecular mass 20000g/mol. Calculate the number average and weight average molecular mass of the polymer.	07	L3	CO4
	b.	Explain the preparation of Kevlar. Mention any four applications.	06	L2	CO4
	c.	Explain the generation of hydrogen by Alkaline water electrolysis with a neat labelled diagram.	07	L2	CO4

**OR**

Q.8	a.	What are conducting polymers? Explain the conduction mechanism in polyacetylene through oxidative doping technique. Mention any two applications.	07	L3	CO4
	b.	What are PV cells? Explain the construction and working of photovoltaic cell.	06	L2	CO4
	c.	Explain the generation of hydrogen by proton exchange membrane electrolysis.	07	L2	CO4

**Module – 5**

Q.9	a.	Define E-waste. Explain the sources and composition of E-waste.	07	L2	CO5
	b.	Explain the ill effects of materials used in manufacturing electrical and electronic products.	06	L2	CO5
	c.	Explain pyrometallurgical process of extraction of E-waste.	07	L2	CO5

**OR**

Q.10	a.	Explain the extraction of gold from E-waste.	07	L2	CO5
	b.	Explain direct recycling of E-waste.	06	L2	CO5
	c.	Write a brief note on role of stakeholders for example, producers consumers, recyclers and statutory bodies in management of E-waste.	07	L2	CO5

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