

MAKE-UP EXAM

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BCHEE102/202

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023 Chemistry for EEE 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.	Draw and explain the band diagrams for conductors, insulators and semi conductors.	7	L2	CO1
	b.	Explain the protection of electronic grade silicon by Float-zone process.	6	L2	CO1
	c.	What are conducting polymers? Explain the mechanism of conduction in poly acetylene.	7	L1	CO1
OR					
Q.2	a.	Explain the preparation, properties and commercial applications of graphene oxide.	6	L2	CO1
	b.	What is electroless plating? Describe electroless plating of copper in the manufacture of double-site PCB.	7	L2	CO1
	c.	In a polymer sample, 20% of molecules have molecular weight of 15,000g/mole, 35% molecules have molecular weight of 25,000g/mole, and remaining molecules have molecular weight of 20,000g/mole. Calculate the number average and weight average molecular weight of the polymer. Calculate polymer dispersity index.	7	L3	CO1
Module – 2					
Q.3	a.	What are batteries? Explain the classification of batteries as primary, secondary and reserve batteries with suitable examples.	6	L2	CO2
	b.	Explain the construction and working of Lithium-polymer battery. Mention its applications.	7	L2	CO2
	c.	What are photo-voltaic cells? Mention the construction and working principle of PV cells. Mention its advantages and disadvantages.	7	L2	CO2
OR					
Q.4	a.	Explain the construction and working of sodium-ion battery. Mention its applications.	7	L2	CO2
	b.	What are fuel cells? Explain the construction and working of methanol-oxygen fuel cell.	6	L2	CO2
	c.	What are flow batteries? Explain the construction and working of vanadium redox flow battery. Mention its applications.	7	L2	CO2
Module – 3					
Q.5	a.	What is metallic corrosion? Explain electrochemical theory of corrosion taking iron as corroding metal.	7	L2	CO3
	b.	What is cathodic protection? Explain sacrificial anode method for the corrosion control and mention its applications.	7	L2	CO3
	c.	What is e-waste? Explain the methods of e-waste disposal.	6	L2	CO3

OR

Q.6	a.	Identify and explain the type of corrosion taking place in the following cases: i) Bolt and nut made up of different metals in contact with each other. ii) Water stored in Iron tank.	6	L2	CO3
	b.	Describe galvanizing and mention its applications.	7	L2	CO3
	c.	What is corrosion penetration rate? A thick brass sheet of area 400 inch is exposed to moist air, after a period of two years, it was found to experience a weight loss of 375g due to corrosion. Given density of brass is 8.73g/cm ³ . Calculate: i) CPR in mpy ii) CPR in mmp year.	7	L3	CO3

Module – 4

Q.7	a.	What are nano-materials? Explain any two size dependent properties of nanomaterials.	7	L2	CO4
	b.	Describe the synthesis of nano materials by sol-gel process. Mention its advantages.	6	L2	CO4
	c.	What are liquid crystals? Write the properties and applications of i) OLED's ii) QLED's.	7	L1	CO4

OR

Q.8	a.	Write a note on nano fibers and nano sensors.	6	L1	CO4
	b.	What are Perovskite materials? Give the properties and applications of Perovskite materials in upto electronic devices.	7	L2	CO4
	c.	What are LCD's Give the properties and applications of i) Twisted nematic LCD's ii) In plane switching LCD's.	7	L2	CO4

Module – 5

Q.9	a.	What are ion-selective electrodes? Explain how p ^H of the given solution is determined using glass electrode.	6	L2	CO5
	b.	What are reference electrodes? Describe the construction and working of calomel electrode. Mention its applications.	7	L2	CO5
	c.	Explain the working principle and instrumentation of electro-chemical sensors. Mention the applications of electrochemical sensors.	7	L3	CO5

OR

Q.10	a.	What are concentration cells? Represent the cell format by the coupling of two copper electrodes immersed in copper sulphate solutions. Concentration of cupric ions in one electrode system is 100 times more concentrated than other. Write the cell reaction and calculate the potential at 300K.	7	L3	CO5
	b.	Explain the principle and instrumentation of colorimetric sensor.	6	L3	CO5
	c.	What are potentiometric sensors? Explain the application of potentiometric sensor in the estimation of iron.	7	L3	CO5
