Answer one complete question from each part.

Q.No		PART-A	M	BTL	COs
1	a	Explain the working principle of conductometric sensors, and mention its applications.	5	L2	CO 1
	b	Explain how electrochemical gas sensors are used to detect SO_x and NO_x gases.	5	L2	CO 1
	c	Interpret the construction and working of lithium ion battery.	5	L2	CO2
OR					
2	a	With a neat sketch explain the measurement of dissolved oxygen by electro-chemical sensors.	5	L2	CO 1
	b	Describe the detection of ascorbic acid by disposable sensors with the oxidation reaction.	5	L2	CO 1
	c	Interpret the construction and working of sodium ion battery.	5	L2	CO 2
PART-B					
3	a	Describe the electrochemical theory of corrosion taking iron as an example.	5	L3	CO 1
	b	A concentration cell is constructed by dipping Cu rod in 0.002M and 0.2M $CuSO_4$ solutions. Calculate the EMF of the cell at 298K. Write the cell representation and the cell reactions.	5	L3	CO 2
	c	With the help of an example explain the galvanic corrosion and corrosion control by sacrificial anode method.	5	L2	CO 2
OR					
4	a	Describe how pH is determined using a glass electrode.	5	L2	CO 1
	b	A metal iron plate was found in a vessel containing acidic media, it was estimated that the original area was 30inch^2 that approximately 2.2kg had corroded. Assuming a corrosion penetration rate of 500mpy for this iron plate in acidic media. Calculate time in years, density of iron is 7.87 g/cm^3.	5	L3	CO2
	c	Illustrate the construction and working of calomel electrode.	5	L2	CO2

| | MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE DEPARTMENT OF CHEMISTRY II - Internal Assessment I- Semester. | Sub. Name: Applied chemistry for CS and allied branches (Sub Code): (BCHES102) Date: 07/12/2023 Total Marks: 30 Faculty: Dr.Manju.B, Dr.Thriveni M K, Prof. Shiva kumara, Prof. Sahana K, Prof. Pallavi A, Prof Surya Chethana |

Answer one complete question from each part.

Q.No		PART-A	M	BTL	COs
1	a	Could you explain how the silicon nanocrystals are used in optoelectronic devices and writes is applications ?	5	L2	1
	b	Write a note on classification of electronic memory devices	5	L2	1
	c	In a sample of a polymer, 100 molecules have a molecular mass of 10^3 g/mol, 250 molecules have a molecular mass of 10^4 g/mol, and 300 molecules have a molecular mass of 10^5 g /mol, calculate the number average, weight average molecular mass and PDI of the polymer.	5	L3	2
OR					
2	a	Describe any four of the qualities and uses of Polythiophenes (P3HT) that are suited for optoelectronic devices	5	L2	1
	b	Describe the manufacture and applications of Kevlar fiber.	5	L2	1
	c	Explain the organic memory devices using p-type and n-type semiconductor materials.	5	L2	2
		PART-B			
3	a	Outline the working principle and applications of quantum dot sensitized solar cells.	5	L2	2
	b	A polymer sample consisting of 10% by weight of macromolecules of molecular weight 1000 and 90% by weight of macromolecules of molecular weight 10000.calculate the number average , weight average molecular mass and PDI of the polymer.	5	L3	2
	c	Describe how conductometric estimation is applied in the situation of weak acids versus strong bases?	5	L2	1
OR					
4	a	Explain the principle and instrumentation potentiometry.	5	L2	2
	b	Explain the Oxidative doping mechanism of poly acetylene	5	L2	2
	c	Describe the operating principles of photoactive and electro-active materials in the display system.	5	L2	1