Model Question Paper-1 with effect from 2021 (CBCS Scheme)

First Semester Engineering Degree Examination

Subject Title 21CHE12/22

TIME: 03 Hours **Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		MODULE 1	Marks
Q.1	a	Define Single Electrode Potential. Derive Nernst equation for single electrode potential.	7
	b	Describe the construction and working of calomel electrode	6
	c	Explain the construction and working of Li-ion battery, mention its applications.	7
		OR	
Q.2	a	Distinguish between primary, secondary and reserve batteries.	6
	b	Explain construction and working of glass electrode.	7
	c	For the cell, Fe/Fe^{2+} (0.01M)//Ag^{+} (0.1M)/Ag write the cell reaction and calculate the emf of the cell at 298K, if standard electrode potentials of Fe and Ag electrodes are -0.44V and 0.8 V respectively.	7
		MODULE 2	
Q.3	a	Define metallic corrosion? Describe the electrochemical theory of corrosion taking iron as an example.	7
	b	Explain: (i) Differential metal corrosion & (ii) Water-line corrosion	6
	c	What is electroplating? Explain the electroplating of chromium	7
		OR	
Q.4	a	What is meant by metal finishing? Mention (any five) technological importance of metal finishing.	6
	b	What is electroless plating? Explain the electroless plating of copper.	7
	c	Explain the factors affecting the rate of corrosion (i) Nature of corrosion product, (ii) Ratio of anodic to cathodic areas & (iii) pH	7
		MODULE 3	
Q.5	a	Explain the synthesis and application of Polyurethane.	7
	b	Describe the mechanism of conduction in Polyaniline and factors influencing conduction in organic polymers.	7
	c	Explain any two size dependent properties of nanomaterials	6
		OR	
Q.6	a	What are nanomaterials? Explain the synthesis of nanomaterial by sol gel process.	7
	b	Write a note on Fullerenes. Mention its applications.	6
	c	Explain the synthesis, properties and application of Polylactic acid.	7

MODULE 4			
Q.7	a	With suitable example explain microwave synthesis and bio catalyzed reactions	7
	b	Explain the synthesis of Adipic acid by conventional route from Benzene and green route from Glucose.	7
	c	Describe the construction and working of Methanol –Oxygen fuel cell.	6
OR			
Q.8	a	Describe the hydrogen production by photo catalytic water splitting method.	7
	b	Explain the synthesis of Paracetamol by conventional and green route from phenol.	7
	c	Explain the construction and working of photovoltaic cells.	6
MODULE 5			
Q.9	a	Explain the theory, instrumentation and applications of flame photometry.	7
	b	Write the principles and requirement of titrimetric analysis.	7
	c	In a COD test, 30.5 cm^3 and 15.5 cm^3 of 0.05 N FAS solutions are required for blank & sample titration respectively. The volume of test sample used was 25 cm^3. Calculate the COD of the sample solution.	6
OR			
Q.10	a	Explain the determination of hardness of water by EDTA method.	7
	b	Define the following units of standard solution. i) Molarity ii) Normality iii) ppm	6
	c	Explain the theory and instrumentation of potentiometry.	7

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q.1	(a)	L1, L2	CO.1	PO-1,2,12
	(b)	L2	CO.1	PO-1.2,12
	(c)	L2	CO.1	PO-1,2,12
Q.2	(a)	L1	CO.1	PO-1,2,12
	(b)	L2	CO.1	PO1,2.12
	(c)	L3	CO.I	PO-1
Q.3	(a)	L2	CO.2	PO-1,2,12
	(b)	L2	CO.2	PO-1,2,12
	(c)	L2	CO.2	PO-1,2,12
Q.4	(a)	L1	CO.2	PO-1,2,12
	(b)	L2	CO.2	PO1
	(c)	L2	CO.2	PO-1,2,12
Q.5	(a)	L2	CO.3	PO-1,2,12
	(b)	L2	CO.3	PO-1,2,12
	(c)	L2	CO.3	PO-1,2,12
Q.6	(a)	L2	CO.3	PO1,2,12
	(b)	L2	CO.3	PO-1,2,12
	(c)	L2	CO.3	PO-1,2,12
Q.7	(a)	L2	CO.4	PO-1,2,12
	(b)	L2	CO.4	PO-1,2,12
	(c)	L2	CO.4	PO-1,2,12
Q.8	(a)	L2	CO.4	PO-1,2,12
	(b)	L2	CO.4	PO-1,2,12
	(c)	L2	CO.4	PO-1,2,12
Q.9	(a)	L2	CO.5	PO-1,2,12
	(b)	L2	CO.5	PO-1,2,12
	(c)	L3	CO.5	PO-1
Q.10	(a)	L2	CO.5	PO-1,2,12
	(b)	L2	CO.5	PO-1,2,12
	(c)	L2	CO.5	PO-1,2,12

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6