Model Question Paper-2 with effect from 2021 (CBCS Scheme)

First Semester Engineering Degree Examination

Subject Title 21CHE12/22

TIME: 03 Hours Max. Marks: 100

Note: Answer any ${\bf FIVE}$ full questions, choosing at least ${\bf ONE}$ question from each ${\bf MODULE}.$

		MODULE 1	Marks			
	a	Define Single Electrode Potential. Obtain the expression for single electrode potential.				
Q.1	b	What are ions Selective Electrodes? Explain construction and working of glass electrode				
	c	Write briefly the recycling of Li-ion battery by direct recycling method	6			
		OR				
	a	Explain the construction, working and applications of Li-ion batteries.	6			
Q.2	b	Explain the experimental determination of P ^H using glass				
Q.2	c	Calculate the single electrode potential of Cu electrode at 27°C when the standard potential of Cu is 0.34V and [Cu ²⁺] 0.1M				
Q.3	a	Explain the following factors which affecting the rate of corrosion i) Ratio of anodic and cathodic areas ii) nature of corrosion product	7			
	b	What is anodizing? Explain the process of anodizing of Al	6			
İ	c	What is electroless plating? Distinguish between electro and electroless plating.	7			
		OR				
	a	What is meant by metal finishing? Mention (any five) technological importance of metal finishing.	6			
Q.4	b	A thick steel sheet of area 400 cm ² is exposed to air near the ocean. After a one year period it was found to experience a weight loss 375 g due to corrosion. If the density of the brass is 7.9g/cm ² calculate the corrosion penetrating rate in mpy and mm/y (given K= 534 in mpy and 87.6 in mm/y)	7			
	c	What is cathodic protection? Explain sacrificial anode and impressed voltage methods of cahtodic protection	7			
		MODULE 3				
Q.5	a	What are polymer composites? Explain the synthesis and application of Kevlar fibre	7			
	b	What are conducting polymers? Explain the various factors influencing the conduction in organic polymers.	7			
	С	Briefly explain the carbon nanotubes with properties and applications.	6			

		OR					
	a	Explain optical and electrical properties of nanomaterials.	7				
Q.6	b	What are nanomaterials? Explain the synthesis of nanomaterials by precipitation method					
	c	What are Biodegradable polymers? Explain the properties and applications of Polylactic acid.					
		MODULE 4					
	a	Briefly explain any six basic principles of green chemistry.	6				
Q.7	b	Explain the following i) Phase transfer catalyst ii) Solvent free reaction					
Q.7	c	With a neat diagram explain the production of Hydrogen by Photocatalytic method	7				
		OR					
Q.8	a	Describe the hydrogen production by photo electrocatalytic method.	7				
	b	Explain the synthesis of Paracetamol by conventional and green route from phenol.					
	С	Explain the construction and working of photovoltaic cells.	6				
		MODULE 5					
	a	Explain the theory, instrumentation and applications of flame photometry.	7				
	b	Write the principles and requirement of titrimetric analysis.	7				
Q.9		In a COD test, 30.5 cm ³ and 15.5 cm ³ of 0.05 N FAS solutions were					
	С	consumed for blank & sample titration respectively. The volume of test					
		sample used was 25 cm ³ . Calculate the COD of the sample solution.					
		OR					
Q.10	a	Explain the determination of hardness by EDTA method.	7				
	b	Define the following units of standard solution.					
		i) Molarity ii) Normality iii) ppm					
	С	Explain the theory and instrumentation of potentiometry.	7				

$ \begin{array}{ c c c c }\hline \textbf{Q.1} & \textbf{ (a)} & \textbf{ L1,} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L3} & \textbf{ CO.1} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (b)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.2} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.3} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.4} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (c)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (d)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (d)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline \textbf{ (d)} & \textbf{ L2} & \textbf{ CO.5} & \textbf{ PO-1,2,12} \\ \hline $	Question		Bloom's Taxonom Level attached	y Course Outcome		Program Outcome	
(b)	Q.1	(a)				PO-1,2,12	
C			L2				
Q.2		(b)	L2	CO.1		PO-1.2,12	
Column		(c)	L2	CO.1		PO-1,2,12	
C C L3	Q.2	(a)	L1	CO.1		PO-1,2,12	
Q.3 (a) L2 (b) L2 (c) L2 (c) L2 (d) L2 (d) L2 (e) L2 (e) L2 (f) L3 (f) L2 (f) L3 (f) L2 (f) L3 (f) L3 (f) L4 (f)		(b)	L2	CO.1		PO1,2.12	
(b)		(c)	L3	CO.I		PO-1	
(b)	Q.3	(a)	L2	CO.2		PO-1,2,12	
$ \begin{array}{ c c c c c } \hline \textbf{Q.4} & \hline (a) & L1 & C0.2 & P0-1,2,12 \\ \hline (b) & L2 & C0.2 & P01 \\ \hline (c) & L2 & C0.2 & P0-1,2,12 \\ \hline \textbf{Q.5} & \hline (a) & L2 & C0.3 & P0-1,2,12 \\ \hline (b) & L2 & C0.3 & P0-1,2,12 \\ \hline (c) & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{Q.6} & \hline (a) & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(b)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{Q.7} & \hline (a) & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.$		(b)	L2	CO.2		PO-1,2,12	
Column C		(c)	L2	CO.2		PO-1,2,12	
$ \begin{array}{ c c c c } \hline (c) & L2 & C0.2 & P0-1,2,12 \\ \hline \textbf{Q.5} & \textbf{(a)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(b)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{Q.6} & \textbf{(a)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(b)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.3 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(b)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.4 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L4 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L4 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L4 & C0.5 & P0-1,2,12 \\ \hline \textbf{(d)} & L4 & C0.5$	0.4	(a)	L1	CO.2			
Q.5			L2	CO.2		P01	
Q.5		(c)	L2	CO.2		PO-1,2,12	
(b) L2 C0.3 P0-1,2,12	Q.5		L2	CO.3		PO-1,2,12	
Cc			L2	CO.3		PO-1,2,12	
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$ \begin{array}{ c c c c c } \hline \textbf{Q.7} & \textbf{(a)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(b)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{Q.8} & \textbf{(a)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(b)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L2} & \textbf{C0.4} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(b)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L3} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(c)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{C0.5} & \textbf{P0-1,2,12} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{L2} & \textbf{L2} & \textbf{L2} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{L2} & \textbf{L2} \\ \hline \textbf{(d)} & \textbf{L2} & \textbf{L2} & \textbf{L2} \\ \hline ($			L2	CO.3		PO-1,2,12	
$ \begin{array}{ c c c c c }\hline (b) & L2 & C0.4 & P0-1,2,12\\\hline (c) & L2 & C0.4 & P0-1,2,12\\\hline\hline \textbf{Q.8} & (a) & L2 & C0.4 & P0-1,2,12\\\hline (b) & L2 & C0.4 & P0-1,2,12\\\hline (c) & L2 & C0.4 & P0-1,2,12\\\hline\hline \textbf{Q.9} & (a) & L2 & C0.5 & P0-1,2,12\\\hline (b) & L2 & C0.5 & P0-1,2,12\\\hline\hline \textbf{(c)} & L3 & C0.5 & P0-1,2,12\\\hline\hline \textbf{Q.10} & (a) & L2 & C0.5 & P0-1,2,12\\\hline\hline \textbf{(b)} & L2 & C0.5 & P0-1,2,12\\\hline\hline \textbf{(c)} & L2 & C0.5 & P0-1,2,12\\\hline\hline \textbf{(d)} & L3 & C0.5 & P0-1,2,12\\\hline\hline \textbf{(d)} & L4 & C0.5 & $	0.7		L2	CO.4		PO-1,2,12	
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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-1,2,12 (c) L2 CO.5 PO-1,2,12 (b) L2 CO.5 PO-1,2,12 (c) L2 CO.5 PO-1,2,12 (c) L2 CO.5 PO-1,2,12 (d) L2 CO.5 PO-1,2,12 (e) L2 CO.5 PO-1,2,12 (c) L2 CO.5 PO-1,2,12 (e) L2 CO.5 PO-1,2,12 (e) L2 CO.5 PO-1,2,12 (e) L2 CO.5 PO-1,2,12 **PO-1,2,12 **CO.5 **PO-1,2,12 **CO.5 **PO-1,2,12 **CO.5 PO-1,2,12 **CO.5 PO-1,2,12 **CO.5 **PO-1,2,12 **CO.5 PO-1,2,12 **CO.5		-		CO.4		PO-1,2,12	
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	4.10						
Bloom'sRemembering(knowledge): L_1 Understanding Comprehension): L_2 Applying (Applic L_3 Taxonom y LevelsHigher order thinking skills		(-)		I	I		
Bloom'sRemembering(knowledge): L_1 Understanding Comprehension): L_2 Applying (Applic L_3 Taxonom y LevelsHigher order thinking skills			Low	er order thinking skil	lls		
y Levels Higher order thinking skills	Taxonom		Remembering(Understanding		Applying (Application)	
						L_3	
Analyzing (Analyzic) L. Valuating (Evaluation) L. Creating (Synthe	y Levels		Analyzing (Analysis): L_4	Valuating (Evaluation	<u> </u>	Creating (Synthesis): <i>I</i>	