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Question Paper Code : 30044

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

First Semester

Civil Engineering

CY25C01 – APPLIED CHEMISTRY – I

(Common to : All Branches)

(Regulations 2025)

Time : 3 hours

Maximum : 100 marks

CO – Course Outcomes

CO1	Understand the importance of chemistry applications with underlying mechanisms.
CO2	Apply the chemistry concepts in widely used devices.
CO3	Analyse the effect of various chemical parameters on performance of engineering systems.
CO4	Perform experimentations as a group and interpret the results
CO5	Communicate findings through case studies and reports.

BL – Bloom's Taxonomy Levels

(L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create)

Answer ALL questions.

PART – A (Total Marks = 40)

[Q. No. 1 to Q. No. 10 ; $10 \times 1 = 10$ Marks (Multiple Choice Questions)]

Q. No. 11 to Q. No. 20; $10 \times 3 = 30$ Marks]

Q.No.	Questions	Marks	CO	BL
1.	The chemical responsible for Total Dissolved Solids is (A) Phenol (B) Benzene (C) Sodium Chloride (D) Ethanol	1	3	1
2.	COD means (A) Chemical oxygen demand (B) Carbon oxygen demand (C) Chemical oxide demand (D) Carbon oxide demand	1	2	1

3.	The size of a nanomaterial is (A) 1–100 mm (B) > 100 mm (C) 1–100 nm (D) 1–100 m	1	2	1
4.	_____ is an example for zero dimensional nanomaterial (A) Au nanoparticle (B) Carbon nano rod (C) Carbon nanotube (D) Ag Nanowire	1	2	1
5.	In an electrochemical cell (A) light energy is converted to electric energy (B) chemical energy is converted into electrical energy (C) electrical energy is converted into light energy (D) electrical energy is converted into mechanical energy	1	1	1
6.	The reaction that takes place at anode is (A) oxidation (B) reduction (C) combustion (D) hydrolysis	1	3	1
7.	The metal commonly used as sacrificial anode for corrosion control is (A) Au (B) Ag (C) Pt (D) Zn	1	1	1
8.	In the electrochemical corrosion, corrosion occurs at (A) Cathode (B) Anode (C) Electrolyte (D) Salt bridge	1	2	1
9.	An example for an emerging battery is (A) Lead acid (B) Ni-Cd (C) Metal hydride (D) Li ion	1	1	1
10.	The electrolyte used in lead acid is (A) HCl (B) H ₂ SO ₄ (C) HNO ₃ (D) H ₃ PO ₄	1	2	1

11.	List out any four requirements for a boiler feed water.	3	2	2
12.	Define boiler corrosion.	3	2	2
13.	Give any three differences between bulk materials and nanomaterials.	3	3	2
14.	List out the factors responsible for size dependent properties of a nanomaterials.	3	3	4
15.	Define electrochemical series.	3	2	3
16.	State the role of salt bridge in a electrochemical cell with an example.	3	2	3
17.	Define chemical corrosion.	3	2	2
18.	Define Pilling Bedworth ratio.	3	2	3
19.	Compare primary and secondary battery.	3	3	1
20.	What are the requirements for a good battery?	3	3	2

PART – B (5 × 12 = 60 marks)

Q.No.		Questions	Marks	CO	BL
21.	(a)	(i) Define priming and foaming and how are they prevented?	6	4	4
		(ii) With a neat diagram, explain reverse osmosis process.	6		
	OR				
	(b)	(i) Define scale and sludge formation in a boiler and list out the preventive methods.	6	4	4
		(ii) How physical and chemical impurities are removed in municipal water?	6		

22.	(a)	(i) How a carbon nanotube is prepared by chemical vapour deposition method.	6	2	4
		(ii) Discuss the optical properties of nanomaterials.	6		
	OR				
	(b)	(i) Explain a suitable method for preparation of nanowire.	6	2	4
		(ii) Discuss any four applications of nanomaterials.	6		
23.	(a)	(i) What is a Redox reaction? Explain the processes of oxidation and reduction with suitable examples.	6	3	5
		(ii) Write a note on conductivity of an electrolyte solution.	6		
	OR				
	(b)	(i) Discuss the factors affecting conductivity of a solution.	6	3	5
		(ii) With an example, explain how the emf of an electrochemical cell is measured?	6		
24.	(a)	(i) Explain the mechanism of electrochemical corrosion.	6	4	6
		(ii) What is meant by inorganic coating? Illustrate inorganic coating on an Iron metal.	6		
	OR				
	(b)	(i) Discuss about the functions of different ingredients of a paint.	6	4	6
		(ii) Discuss any four factors affecting corrosion.	6		
25.	(a)	With a neat diagram, explain the charging and discharging cell reactions of a secondary battery of your own choice. List out its applications.	12	1	5
	OR				
	(b)	With a neat diagram, explain the charging and discharging cell reactions of any emerging battery. List out its advantages over a secondary battery.	12	1	5