

Reg. No.

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B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

First Semester

CY22152 – Engineering Chemistry*(Common to AE, ME & MN)***(Regulation 2022)****TIME: 3 HOURS****MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Identify electrochemical cells, corrosion and fundamental aspects of batteries.	2
CO 2	Interpret the photochemical reactions and make use of spectroscopic techniques.	2
CO 3	Realize the structures, properties and applications of nanoparticles.	2
CO 4	Acquire knowledge on the basic properties of engineering materials and its applications.	2
CO 5	Illustrate the types of fuels, its calorific value and significance of flue gas analysis.	3

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

	CO	RBT LEVEL
1. Why is hydrogen electrode not generally used as a reference electrode?	1	2
2. Can we use a nickel spatula to stir a solution of copper sulphate?	1	3
3. Give the functions of salt bridge of a cell.	1	2
4. Electrochemical cells stop working after particular time. Justify.	1	3
5. Give one point of difference between photochemical and thermal reactions.	2	3
6. State quantum yield of a reaction.	2	2
7. How would you explain very low quantum yield of some photochemical reactions?	2	3
8. Provide the formula for energy contained in one photon.	2	3
9. What is top-down approach in nanotechnology?	3	2
10. Mention the purpose of using vacuum in the laser ablation chamber.	3	2
11. How will you prevent the aggregation of metal nanoparticles in the solution?	3	3
12. Explain the quantum confinement.	3	2
13. How are viscosity and viscosity-index inter-related?	4	3
14. What is prime requisite of a material to be used as refractory?	4	2
15. Mention the ways to reduce thermal spalling of a refractory in a furnace.	4	4
16. Pyrometric cone equivalents of bricks A, B and C are 28, 32 and 36 respectively. Arrange these in order of their increasing refractoriness.	4	4
17. Distinguish between gross and net calorific value of a fuel.	5	3
18. Provide the importance of determining fixed carbon in coal.	5	3
19. What is cetane value of a diesel fuel?	5	2
20. Select the compound which possesses highest octane number and highest cetane number out of n-heptane, n-hexadecane, n-octane and isooctane.	5	4

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Derive the Nernst equation for a single electrode potential.	10	1	3
	(OR)			
(b)	What is electrochemical series? Give its applications with suitable examples.	10	1	3
22. (a)	Explain the various non-radiation and radiation processes with the help of Jablonski diagram.	10	2	2
	(OR)			
(b)	Write a short note on photosensitization with an example.	10	2	2
23. (a)	(i) Explain the process of chemical vapour condensation with a neat sketch.	5	3	3
	(ii) Explain Sol-Gel synthesis for producing nanomaterials.	5	3	3
	(OR)			
(b)	Discuss the applications of nanomaterials in any four fields.	10	3	3
24. (a)	(i) Based on the structure of graphite suggest how it can be used as a solid lubricant.	5	4	3
	(ii) Classify the constituents of composite materials and explain their functions.	5	4	3
	(OR)			
(b)	What are refractories? Give an account of any three characteristics of a good refractory material.	10	4	3
25. (a)	Describe in brief, the manufacture of metallurgical coke by Otto Hofmann's oven method.	10	5	3
	(OR)			
(b)	How is ultimate analysis carried out in the laboratory?	10	5	3

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Describe the physico-chemical principles involved in the manufacture of water gas.	10	5	5
