Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

First Semester

Common to all Branches

CY3151 / UCHT24104 - Engineering Chemistry

Regulations – 2021 & 2024

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Predict the significance of BOD in determining water pollution levels.	L3	1	2
2.	How does reverse osmosis work in desalination?	L1	1	2
3.	Outline the main differences between nanomaterials and bulk materials.	L2	2	2
4.	Give an example of a nanoparticle and explain its application in medicine.	L2	2	2
5.	State the concept of eutectic point in a two-component phase system.	L3	3	2
6.	Define and provide an example of a hybrid composite.	L2	3	2
7.	Predict the significance of cetane number in diesel fuel.	L3	4	2
8.	Explain the term "knocking" in internal combustion engines.	L2	4	2
9.	What is the mass defect?	L2	5	2
10.	List any two advantages of lithium-ion batteries over lead-acid batteries.	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Outline any two methods of disinfection used in municipal water treatment, highlighting the pros and cons of each method.	L2	1	8
		ii	Discuss the causes and effects of boiler corrosion. Explain the internal treatment methods used to prevent it.	L2	1	8
			Or			
	b		Explain the methods for determining pH, COD, and BOD in water samples.	L2	1	16
12.	a		Explain the mechanical and magnetic properties of nanomaterials and how they differ from their bulk counterparts.	L3	2	16
			Or			
	b		Discuss the size-dependent properties of nanomaterials with respect to optical, electrical, and mechanical properties.	L3	2	16

13.	a	i	Explain the construction and interpretation of a simple eutectic phase diagram using the lead-silver system.	L2	3	10
		ii	Differentiate between metal matrix composites and polymer matrix composites, highlighting their properties and applications.	L2	3	6
			Or			
	b		Explain phase rule and explain its significance in the study of material systems. Draw and explain the phase diagram of the water system.	L2	3	16
14.	a		Compare the higher and lower calorific values of fuels and explain their significance in combustion processes.	L3	4	16
			Or			
	b	i	Compare the Bergius process with the Fischer-Tropsch process for the production of synthetic fuels.	L3	4	8
		ii	Discuss the ORSAT method for flue gas analysis, and explain its role in monitoring CO_2 emissions.	L3	4	8
15.	a		Explain the working principle of a solar cell and discuss recent developments in solar cell materials.	L3	5	16
			Or			
	b		Describe the construction and working of a lithium-ion battery. Explain its advantages over other types of batteries.	L3	5	16