

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026****FIRST SEMESTER****ME-Environmental Engineering****PEVT2401– ENVIRONMENTAL CHEMISTRY****Regulations – 2024****Duration: 3 Hrs.****Maximum: 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BTL	CO	Marks
1.	State Le Chatelier's Principle.	L1	1	2
2.	Explain the chemical reactions that cause ocean acidification.	L2	1	2
3.	How hydrolysis helps the breakdown of pollutants in aquatic systems?	L2	2	2
4.	Define oxidation and reduction with examples.	L1	2	2
5.	What are the primary pollutants involved in Ozone layer depletion?	L1	3	2
6.	What are the primary sources of black carbon?	L1	3	2
7.	What are the common cations taking part in soil ion exchange?	L1	4	2
8.	Define the term electro kinetic remediation.	L1	4	2
9.	List the major toxic forms of mercury found in the environment.	L1	5	2
10.	What is titania (TiO ₂) and where is it commonly used?	L1	5	2

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

Q.No	Questions	BLT	CO	Marks
11. a	i For the reaction $N_2+3H_2\rightleftharpoons 2NH_3$, if initially 1 mol of N ₂ and 3 mol of H ₂ are placed in a 1 L container and the equilibrium constant $K_c=0.5$ at the given temperature, calculate the equilibrium concentrations of all species.	L4	1	8
	ii Examine the variables influencing the hydroxide precipitation of heavy metals like Cd ²⁺ and Hg ²⁺ from industrial effluent. What part do amphoteric hydroxides, pH, and complex formation play in selective removal?	L4	1	8
Or				
b	i Analyze the effects of ocean acidification on coral reef ecosystems.	L4	1	8
	ii Examine whether a chemical synthesis process complies with the principles of green chemistry.	L4	1	8
12. a	i How would you determine the rate of hydrolysis of a pesticide in a freshwater sample?	L3	2	8
	ii Apply the concept of volatilization to explain the loss of a chemical from a wastewater pond.	L3	2	8

Or

	b	i	Determine the predominant species of iron under acidic conditions using pE-pH diagram.	L3	2	8
		ii	Apply double layer theory to explain why adding salt destabilizes a colloidal solution.	L3	2	8
13.	a	i	Analyze the connection between industrial emissions and the rate of ozone layer depletion.	L4	3	8
		ii	Compare the environmental impact of CO ₂ vs. methane (CH ₄).	L4	3	8
Or						
	b	i	Analyze the relationship between fossil fuel combustion and acid rain formation.	L4	3	8
		ii	Compare the similarities and differences in composition between natural and anthropogenic particulates?	L4	3	8
14.	a	i	If a farmer adds a fertilizer that releases a large number of hydrogen ions into the soil, how would this affect the soil pH, and what are the impacts on plant growth?	L3	4	8
		ii	Apply your knowledge of soil ion exchange to suggest how to remove excess sodium from sodic soils.	L3	4	8
Or						
	b	i	Given a soil sample with high sodium content, how would you design a leaching procedure?	L3	4	8
		ii	Apply the concept of electric current movement in electrokinetic remediation to suggest how electrode placement affects remediation efficiency.	L3	4	8
15.	a	i	Examine the pathway of dioxin entry into the food chain and identify critical control points.	L4	5	8
		ii	Distinguish between natural and anthropogenic sources of PAHs.	L4	5	8
Or						
	b	i	How do the properties of CNTs contribute to the mechanical strength of nanocomposites?	L4	5	8
		ii	Analyze the environmental impact of using nanomaterials at a large scale.	L4	5	8
