

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)
B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Sixth Semester

Mechanical Engineering

CME397-Surface Engineering

Regulations - 2021

Duration : 3 Hrs

Maximum: 100 Marks

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

Q.No	Questions	BLT	CO	Marks
1.	Enumerate the purpose of surface engineering in industries.	L1	1	2
2.	What are the various thermal considerations in sliding contact?	L2	1	2
3.	List the important characteristics of low stress abrasion wear.	L1	2	2
4.	How would you compare two body wear and three body wear?	L2	2	2
5.	Give the advantages of ASTM standard for corrosion testing.	L1	3	2
6.	Describe the benefits of corrosion inhibitor.	L2	3	2
7.	Distinguish between superhydrophobic and superhydrophilic surfaces.	L2	4	2
8.	How do deposition and ion implantation techniques differ from one another?	L1	4	2
9.	Why is magnesium alloy preferred in aerospace applications?	L2	5	2
10.	What is bio-tribology? Mention one key area where it is applied.	L1	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a Describe various surface measurement techniques. Compare contact and non-contact methods used for measuring surface roughness.	L2	1	16
	Or			
	b Discuss the difference between static friction and rolling friction. Explain with examples and derive the basic expressions involved.	L2	1	16
12.	a Explain how wear debris analysis can be used for predicting machinery failure. Give suitable examples.	L3	2	16
	Or			
	b Explain the wear behavior of nonmetals such as polymers and composites. How is it different from that of metals?	L3	2	16

13.	a	Discuss salt spray (fog) testing and immersion testing as methods for evaluating corrosion.	L2	3	16
		Or			
	b	Describe anodic protection. How is it different from cathodic protection? In what situations is it used?	L2	3	16
14.	a	Describe Physical Vapor Deposition (PVD) and Chemical Vapor Deposition (CVD) techniques. Compare their working principles and applications.	L2	4	16
		Or			
	b i	Discuss the principles and applications of laser surface hardening and laser surface alloying.	L2	4	8
	i	Describe CNC coatings. How do they differ from conventional coating technologies?	L2	4	8
15.	a	Discuss the properties and applications of any four nickel-based alloys used for wear resistance applications.	L2	5	16
		Or			
	b i	Discuss how advanced materials like superalloys, ceramics, and composites are selected based on tribological requirements.	L2	5	8
	i	What is nano-tribology? Discuss techniques used to measure friction and wear at the nanoscale.	L2	5	8