

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Third Semester

Mechanical Engineering

ME3392 - Engineering Materials and Metallurgy

Regulations - 2021

Duration: 3 Hrs

Maximum: 100 Marks

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Enlist the different types of phase diagrams?	RE	1	2
2.	Classify steel based on its microstructure.	UN	1	2
3.	Compare hardening and tempering.	RE	2	2
4.	Define hardenability of a material.	RE	2	2
5.	List four important alloying elements added in alloy steels.	AN	3	2
6.	Mention the properties and application if shape memory alloys.	RE	3	2
7.	Enumerate the factors that affect the crystallinity of the polymers.	AP	4	2
8.	List two important engineering ceramics used in the high temperature applications.	AN	4	2
9.	Define twinning process.	RE	5	2
10.	Mention the various factors that affect the fatigue strength of material.	UN	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Draw Iron – Iron carbide equilibrium diagram and label the various phase fields. Also explain the various invariant reactions.	UN	1	13
	Or			
	b Elaborate the classification of cast-iron with microstructure, properties and application.	UN	1	13
12.	a Explain CCT diagram with neat sketch and indicate all the phases with microstructure.	AP	2	13
	Or			
	b Describe Jominy end quench test and its applications and state the objectives of surface hardening.	AP	2	13

13.	a Classify and discuss the different types tool steels and state their properties and typical applications.	AN	3	13
	Or			
	b Explain the following and their properties and applications: (i) Titanium alloys (ii) Aluminium alloys (iii) Brass	AN	3	13
14.	a Explain in detail the properties and applications of any five commonly used engineering polymers.	AP	4	13
	Or			
	b Discuss the properties and applications of Al_2O_3 , SiC and Si_3N_4 . In detail.	AP	4	13
15.	a What is Twinning? And explain the different types of fracture in detail.	RE	5	13
	Or			
	b With a neat sketch, Explain Vickers rock well hardness test.	RE	5	13

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a Discuss the various types of titanium alloy, their composition, properties and applications.	AN	3	15
	Or			
	b Discuss Izod and Charpy test in detail with a neat sketch.	AN	5	15