

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Fifth Semester

Mechanical Engineering

ME3592 - Metrology and Measurements

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.	Differentiate between precision and accuracy.	L2	1	2
2.	Mention the sources of error and its remedial measures.	L1	1	2
3.	Which angle measuring device is best suitable for probing the V-block?	L2	2	2
4.	A Vernier scale consists of 25 divisions on 12 mm spacing and the main scale has 24 divisions on 12 mm. What is the least count?	L3	2	2
5.	Define Interchangeability.	L1	3	2
6.	Draw the relationship between fundamental, upper and lower deviations in limits and fits.	L2	3	2
7.	What are the various factors affecting surface roughness of a machined component?	L2	4	2
8.	What is 3D surface metrology, and why is it important in measuring surface characteristics?	L2	4	2
9.	List any four possible causes of errors in CMM.	L1	5	2
10.	What are the elements of machine vision system?	L1	5	2

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Illustrate the various factors affecting the accuracy of the measuring system with an appropriate industrial application.	L3	1	16
	Or			
	b Demonstrate the process of calibration for a specific measuring instrument.	L3	1	16
12.	a Discuss the procedure to measure the unknown angles with sine bar. also, mention the use of sine blocks. sine plates, and sine tables.	L2	2	16
	Or			
	b Explain the working principle of an autocollimator with a neat sketch and its application.	L2	2	16

13.	a	Compare the various types of fits (clearance, interference, and transition) and discuss their applications.	L4	3	16
		Or			
	b	Differentiate between tolerance stack-up and tolerance charting and discuss their roles in maintaining product quality.	L4	3	16
14.	a	Compare the benefits and limitations of stylus-based and optical measurement techniques for surface finish analysis.	L4	4	16
		Or			
	b	Differentiate between straightness, flatness, and roundness deviations and discuss how each is measured.	L4	4	16
15.	a i	Compare and contrast the advantages and limitations of laser scan micrometers and laser interferometers.	L4	5	8
	ii	Analyze the factors that influence the accuracy and precision of CMM measurements.	L4	5	8
		Or			
	b	Evaluate the potential of machine vision systems in improving production efficiency and product quality.	L4	5	16