

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

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

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.	Distinguish between sensitivity and range with suitable example	UN	1	2
2.	Define sensitivity in measurement.	RE	1	2
3.	How the mechanical comparator is used?	RE	2	2
4.	List any two precautions to be followed when using gauge blocks.	AN	2	2
5.	What are the limitations of tolerance analysis?	RE	3	2
6.	Draw the relationship between fundamental, upper and lower deviations in limits and fits.	AN	3	2
7.	What are the different types of fits?	RE	4	2
8.	Identify two optical measurement techniques.	AN	4	2
9.	Discuss the advantages of a Coordinate Measuring Machine (CMM).	UN	5	2
10.	What is meant by an alignment test on machine tools?	RE	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 Discuss with a suitable example explain the various elements of generalized measurement systems. Or	UN	1	13
	b Elaborate on the different types of errors in measurement, their causes, and methods for controlling them in detail.	UN	1	13
12.	a Explain the construction, working principle and application of sine bar. Or	UN	2	13
	b Explain the construction and working principle of autocollimator with a neat diagram.	UN	2	13
13.	a i Elaborate the principle of limit gauging.	UN	3	7
	ii Why hole basis system is generally preferred in tolerance analysis? Explain.	UN	3	6
	Or			

	b	A hole and shafting system have the following dimensions 50 HS/CS: The standard tolerance is given by $i = 0.45 (\sqrt[3]{D}) + 0.001 D$ where, D= dia(mm) of geometric mean of steps. i = standard tolerance, micron. The multiplier of grade 8 is 25, The fundamental deviation for shaft C, for D > 40 mm. is given by $-(95+0.8 D)$ microns. The diameter range ties b/w 50 to 80 mm sketch the fit and show these upon the achial dimension of hole and shaft.	UN	3	13
14.	a	Discuss any one of the direct methods of surface finish measurements. Or	AN	4	13
	b	Classify the various methods by which roundness is measured. Explain any one in detail.	AN	4	13
15.	a	List the various probes used in CMM and explain the working principle of touch trigger probes based on its construction. Or	RE	5	13
	b	Define machine vision. Name the four types machine vision system, explain how machine vision is suitable in metrology systems.	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 Illustrate the stylus type surface roughness measuring instrument with a suitable sketch. Or	UN	4	15
	b Explain the mechanical comparator and its types in detail with a neat sketch.	UN	2	15