

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026***Fifth Semester**Mechanical Engineering***ME3592 – METROLOGY AND MEASUREMENTS***USE of PSG Design Data Book is permitted in the Examination**Regulations - 2021***Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BTL	CO	Marks
1.	State the objectives of metrology.	L1	1	2
2.	Assess the impact of ISO in measurements.	L5	1	2
3.	Justify -" Sine bars are suitable for measuring surface angles of less than 45°".	L5	2	2
4.	Analyze the comparators are used in industry.	L4	2	2
5.	Write short notes on interchangeability.	L2	3	2
6.	How can tolerance analysis be applied to reduce the scrap in manufacturing?	L3	3	2
7.	Compare conventional tolerance and geometric tolerance (GD).	L4	4	2
8.	Enlist the methods of assessment of average roughness.	L1	4	2
9.	List the any two features of CMM software.	L1	5	2
10.	What is the principle behind the computed tomography?	L2	5	2

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

Q.No	Questions	BLT	CO	Marks
11. a	Define errors. Explain the different types of error and causes of error in measurement.	L2	1	16
Or				
b	Discuss the sources of uncertainty. Enumerate the various steps involved in calculating uncertainty.	L2	1	16
12. a	Give the various types of linear measuring instruments be used to ensure the quality control in a manufacturing. And explain any two linear measuring instruments with neat sketch.	L3	2	16
Or				
b i	Demonstrate, with neat sketch, the procedure of gear tooth vernier caliper to measure the chordal thickness of a gear tooth.	L3	2	8
ii	How would you use an angle dekkor to measure the angle of the component?	L3	2	8
13. a	Calculate the limits for a hole shaft pair designated 28 H9/d8. Show graphically the deposition of tolerance zones with reference to the zero line. The lower deviation for a H type hole is zero. 28 mm lies in the diameter range 18 mm to 30 mm. Standard tolerances for IT 8 is 25i and IT 9 is 40i, where "i" is the standard tolerance unit microns and "i" given as $i (\mu m) = 0.45 \sqrt[3]{D} + 0.001D$, where D is in mm. The upper deviation for "d" shaft is $-16 D^{0.44}$.	L3	3	16
Or				
b	What is tolerance stack-up? Explain the various methods of tolerance stack-up analysis.	L3	3	16
14. a	"Illustrate with neat sketch, the step by step procedure for determining the flatness of a surface".	L3	4	16

Or

b	Elaborate on any two direct measuring instruments of surface roughness with neat sketch.	L3	4	16
15. a	With a neat sketch explain the construction and working of AC laser interferometer.	L2	5	16
Or				
b i	Briefly explain the working principles of any two type of CMM.	L2	5	8
ii	Define machine vision system. Apply the basic concept of machine vision system to inspect the surface defects on production line.	L2	5	8