Code: 20ME3602

III B.Tech - II Semester – Regular / Supplementary Examinations
APRIL 2024

METROLOGY AND MEASUREMENTS
(MECHANICAL ENGINEERING)

Duration: 3 hours   Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level   CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	With an example enumerate primary, secondary, and tertiary measurements.	L2	CO1	7 M
	b)	List out the different sources of errors. How to eliminate them?	L2	CO1	7 M
OR					
2	a)	Discuss the terms interchangeability and selective assembly with suitable examples.	L2	CO1	7 M
	b)	A hole and mating shaft are to have a nominal assembly size of 40 mm. The assembly is to have a maximum clearance of 0.15 mm and a minimum clearance of 0.05 mm. The hole tolerance is 1.5 times the shaft tolerance. Determine the limits for both hole and shaft: By using hole basis system.	L3	CO1	7 M

UNIT-II

3	a)	What is wringing? Explain the procedure for wringing of slip gauges?	L2	CO2	6 M
	b)	Explain how sine bar is used to measure: (i) Angle of small component (ii) Angle of large component.	L2	CO2	8 M

OR

4	a)	Describe the working and uses of visual gauging.	L2	CO2	7 M
	b)	Discuss about the advantages and disadvantages of mechanical comparators.	L2	CO2	7 M

UNIT-III

5	a)	What is the best wire size? Derive the expression for the same in terms of the pitch and angle of thread.	L3	CO3	6 M
	b)	List out the various elements of screw thread and define them.	L2	CO3	8 M

OR

6	a)	Describe the parkinson's gear tester and state its limitations.	L2	CO3	10 M
	b)	List out the various elements of spur gear which are checked for the accuracy of the gear.	L2	CO3	4 M

UNIT-IV

7	a)	Describe the principle and operation of Taylor-Hobson Talysurf roughness measurement.	L3	CO4	7 M

	b)	List out and describe the various numerical methods of assessment of surface finish.	L2	CO4	7 M
OR					
8	a)	What are the various instruments used for measuring flatness of a surface plate? Describe the test procedure by using one of such instrument.	L2	CO4	8 M
	b)	Discuss in detail about Tominlison surface meter.	L2	CO4	6 M

UNIT-V

9	a)	What are the different types of electrical strain gauges? Explain briefly.	L2	CO5	7 M
	b)	Explain how to measure bending strain using full bridge circuit?	L2	CO5	7 M
OR					
10	a)	Describe the construction and operation of Bourdon-tube pressure gauge.	L2	CO5	7 M
	b)	Describe a Rotameter and explain its working with figure.	L2	CO5	7 M