Q. Code:776995

Reg. No. | | | | | | | | | | | | | |

B. E / B. TECH.DEGREE EXAMINATIONS, MAY 2024

Fifth Semester

ME18501 – METROLOGY AND QUALITY CONTROL

(Mechanical Engineering)

(Regulation 2018 /2018A)

(use of approved Statistical table is permitted)

TIME:3 HOURS **MAX. MARKS: 100**

CO1 Students will have the ability to select the suitable mechanical measuring instruments for linear and angular measurements and calibrate them to improve the accuracy.

CO2 Students can acquire the knowledge on form measurements with effective communication for engineering applications

CO3 Students can acquire the knowledge on advanced measuring devices and their applications for dimensional and form measurements.

CO4 Students will have the ability to select the suitable instruments to measure the different process parameters like pressure, temperature and force.

CO5 Students will have the ability to apply the different quality principles and sampling techniques to ensure the quality of the products.

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define: Calibration.	**1**	**1**
2.	State the principle of gauge design.	**1**	**1**
3.	List any two limitations of sine bar.	**2**	**1**
4.	Describe the applications of Parkinson's gear tester.	**2**	**1**
5.	Name the any two application of interferometer in tool room.	**3**	**1**
6.	Define Image acquisition.	**3**	**2**
7.	List any two torque measuring instruments.	**4**	**2**
8.	Write the applications of LVDT.	**4**	**2**
9.	Write short note on: Quality of conformance.	**5**	**2**
10.	Name any four SQC tools.	**5**	**2**

PART- B (5x 14=70Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Briefly explain the elements of a measuring system.	**(6)**	**1**	**3**
	(ii)	Discuss the applications of limit gauges in automobile industry.	**(8)**	**1**	**3**
		(OR)			
(b)	**(i)**	What do you understand by the term least count, deduce the least count of vernier caliper and micrometer.	**(8)**	**1**	**3**
	(ii)	Compare Systematic error and random error.	**(6)**	**1**	**3**

			Marks	CO	RBT LEVEL
12. (a)	(i)	A 100 mm sinebar is to be set up to angle of 33^0, determine the slip gauges needed from 87 pieces set.	(8)	2	3
	(ii)	Explain the construction and working principle of auto collimator with suitable sketch.	(6)	2	3
		(OR)			
(b)	(i)	Derive an expression for best size wire with suitable diagram.	(6)	2	3
	(ii)	Name the methods of measuring gear tooth thickness and explain any one in detail.	(8)	2	3
13. (a)	(i)	Explain the working principle AC laser interferometer with neat sketch.	(8)	3	3
	(ii)	Write the applications of interferometer in angle measurement.	(6)	3	3
		(OR)			
(b)	(i)	What are the types of probes used in CMM? Give details about anyone with a sketch.	(10)	3	3
	(ii)	Identify the suitable application of image processing technique in the quality control division.	(4)	3	3
14. (a)	(i)	List the low cost flow measuring instrument. Suggest and discuss a suitable measuring instrument being used in the domestic water supply application.	(8)	4	4
	(ii)	List the various torque measuring instruments. Explain any one type with neat diagram.	(6)	4	4
		(OR)			
(b)	(ii)	List the various temperature measuring instruments. Select and discuss suitable measuring instrument being used in the water heater.	(8)	4	4
	(ii)	Write the applications of Infrared temperature sensor with suitable diagram.	(6)	4	4
15. (a)	(i)	Compare control chart variables and control chart attributes with suitable example.	(6)	5	4
	(ii)	Explain procedure to draw X-bar and R chart.	(8)	5	4
		(OR)			
(b)	(i)	State advantages of sampling inspection over 100% Inspection.	(6)	5	4
	(ii)	List out the elements of ISO 9000 and elaborate the steps involved for a industry to get ISO 9000 certification.	(8)	5	4

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Construct a high accuracy measuring system for surface roughness measurement. Discuss the merits and demerits.	(10)	3	5