



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Automobile Engineering

Semester End Examination; July / August - 2022

Measurements and Metrology

Time: 3 hrs

Max. Marks: 100

Course Outcome

The Students will be able to:

CO1: To understand the different standards of measurement.

CO2: To understand the concepts of comparators

CO3: To identify, construction and working of the different transducers, and intermediate devices

CO4: Describe the different Torque and force measuring methods

CO5: Discuss the measurement techniques of strain, pressure and temperature

Note: i) PART-A is compulsory. One question from each unit for maximum of 2 marks.

ii) PART-B: Answer any **TWO** sub questions (from a, b, c) from each unit for a Maximum of 18 marks.

Q. No.	Questions	Marks
	I : PART - A	10
I a.	Define threshold and linearity.	2
b.	What do you mean by a secondary transducer?	2
c.	Write any two applications of the hydraulic Dynamometers.	2
d.	Explain thermocouple.	2
e.	List any two characteristics of comparator.	2
	II : PART - B	90
	UNIT - I	18
1 a.	Define measurement and list down the significance of the measurement.	9
b.	Classify and explain the errors in measurement.	9
c.	Briefly explain the history of wavelength standard, also list their merits and demerits.	9
	UNIT - II	18
2 a.	With suitable sketch, explain the primary and secondary transducers in an engineering application.	9
b.	Explain the working principle of inductive types of transducer with a neat sketch. Also list their merits and demerits.	9
c.	Explain any two input circuitry for intermediate electrical devices.	9
	UNIT - III	18
3 a.	With a neat diagram, explain the measuring device used to calibrate the universal testing machine.	9
b.	List down the different types of dynamometers, explain briefly. Also differentiate the hydraulic and electrical dynamometers.	9
c.	Sketch and explain the X-Y plotters, also list their applications.	9

UNIT - IV**18**

- 4 a. Explain the orientation of strain gauges to measure different forces along with neat diagrams. 9
- b. With a neat sketch, explain the high-pressure measuring device. List the applications of the same. 9
- c. Sketch and explain the non-contact type of furnace temperature measuring device. 9

UNIT - V**18**

- 5 a. What do you mean by comparator? Explain the characteristics of the comparator. 9
- b. With a suitable sketch explain the double reflected mirror type comparator, also list their applications and advantages. 9
- c. With a neat diagram, explain the essential of sine center to measure the unknown angle. 9

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