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

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester, B.E. - Automobile Engineering

Semester End Examination; Dec - 2016/Jan - 2017

Measurement and Metrology

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Explain the concept of generalized measurement system using block diagram. Mention their requirement and significance. 10

b. Define the terms and state the significance of following terms used in measurement : 10

i) Accuracy ii) Precision iii) Sensitivity iv) Calibration v) Hysteresis.

2 a. Sketch and explain international prototype meter and imperial yard standard. 8

b. What is wringing? Explain the procedure of wringing slip gauge. Give the details of M112 set and built the following dimensions : 8

i) 49.3115 ii) 68.208 iii) 52.496

c. State important characteristics of line standard and end standard instruments. 4

UNIT - II

3 a. Define comparator. When are the essential characteristics of good comparators? Mention the classification of comparators. 8

b. With a neat sketch, describe the construction and working of Sigma comparator. 8

c. List the advantages and disadvantages of optical comparators. 4

4 a. Explain with sketch, measurement of unknown angles of small and heavy components using sine bar. Also mention the limitations of sine bar. 8

b. With a neat sketch, explain construction and working of LVDT. 8

c. Sketch and explain optical bevel protractor. 4

UNIT - III

5 a. Define “Transfer Efficiency”. Distinguish between active and passive transducer. 4

b. Define transducer. List out six mechanical transducing elements and mention the transducing action they perform. 8

c. With a neat sketch, explain the construction and working of an ionization transducer. Mention their application. 8

6 a. Explain the inherent problems present in any mechanical intermediate modifying systems. 8

b. Explain with a neat sketch, the principle of microptic autocollimator. 6

c. Explain the principle of operation of optical flat. 6

Contd.....2

UNIT - IV

7	a.	Explain with a sketch, the analytical balance (equal arm balance).	8
	b.	Sketch and explain measurement of force by proving ring.	6
	c.	With the help of a neat sketch, explain the working principle of prony brake dynamometer and mention its limitations.	6
8	a.	With neat sketch, explain the construction and working of eddy current dynamometer.	7
	b.	Explain "Cathode Ray Oscilloscope" with a block diagram and mention its application.	7
	c.	Explain with a block diagram the working of X-Y plotters.	6

UNIT - V

9	a.	Describe the process of preparation and mounting of strain gauges. Also mention the problems associated with strain gauge installations.	10
	b.	Define absolute pressure and vacuum gauge pressure. With a neat sketch, explain the construction and working of McLeod gauge.	10
10	a.	What is a thermocouple? State and explain the laws of thermocouple.	6
	b.	Describe the construction and working of optical pyrometer with a neat sketch.	7
	c.	Explain with a neat sketch, Pirani thermal conductivity gauge.	7

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