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

(An Autonomous Institution affiliated to VTU, Belgaum)
Fourth Semester, B.E. - Automobile Engineering
Semester End Examination; June - 2016
Measurements and Metrology

Time: 3 hrs   *Max. Marks: 100*

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.
    ii) Assume suitable missing data if any.

UNIT - I

1 a.	Explain measurement. Enumerate the requirements and significance of mechanical measurement.	7
b.	Explain the concept of generalized measurement system using a block diagram with a suitable example.	6
c.	Define error in measurement. Describe types of sources of errors in measurement system.	7
2 a.	Define metrology. Explain the objectives of metrology.	6
b.	Distinguish between Line and End standards, discuss their relative characteristics.	8
c.	Explain with neat sketch, the constructional features of International prototype meter.	6

UNIT - II

3 a.	What is comparator? How the comparators are classified? What are the required characteristics of a good comparator?	10
b.	Explain construction and mechanism of a Sigma comparator with neat sketch.	10
4 a.	Describe with neat sketch construction and working of LVDT. Mention their advantages and disadvantages.	8
b.	Explain with neat sketch the working of 'SOLEX' pneumatic comparators.	6
c.	Explain with a neat sketch of sine bar.	6

UNIT - III

5 a.	Define transfer efficiency. With an example explain a primary and secondary transducer.	8
b.	Give the classification of mechanical transducer over other transducer.	6
c.	State the advantages of electrical transducer over other transducers.	6
6 a.	With an example explain a mechanical intermediate modifying device.	6
b.	Explain the inherent problems present in mechanical intermediate modifying systems.	6
c.	Explain with a neat sketch the principle of microptic auto conllimator.	8

UNIT - IV

7 a.	What is sensitivity of analytical balance? Derive an expression to measure it.	7
b.	Explain the working of proving ring with a neat sketch.	6
c.	Define torque. With the help of neat sketch explain hydraulic dynamometer.	7

8 a. What are terminating devices? Explain with examples the way they provide information.   6

   b. Explain with a neat sketch stylus type oscillograph. Mention their application.   6

   c. What is X-Y plotter? With a block diagram explain its working.   8

UNIT - V

9 a. What are requirements for accurate strain measurement? Discuss the problems associated with gauge installation.   8

   b. Where Pirani gauge is used and give the working principle with sketch.   6

   c. Sketch and explain Tuckerman Optical Extensometer.   6

10 a. What is thermocouple? What is reference junction in thermocouple? State and explain the laws governing the functioning of thermocouples.   10

   b. What is pyrometer? Explain the optical pyrometer with a neat sketch. Mention a few applications of pyrometers.   10

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