

5E6203Roll No. : 16 FE A ME 010Total Printed Pages : **3****5E6203****B. Tech. (Sem. V) (Main / Back) Examination, November - 2018****Mech. Engineering****5ME3A Measurement & Metrology****Time : 3 Hours]****[Total Marks : 80****[Min. Passing Marks : 26**

Attempt any five questions, selecting one question from each unit.

All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL 2. NIL

UNIT - I

- 1 (a) Give the structure of generalized measuring system and explain in detail.

6

- (b) In a Wheatstone bridge a change of 9Ω in the unknown arm of the bridge is required to produce a change in the deflection of 3mm of the galvanometer. Determine :

- (i) Sensitivity, and
(ii) Deflection factor

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- (c) Differentiate between the terms "repeatability" and "Reproducibility".

4**OR****5E6203]****1****[P.T.O.**

- 1 (a) Explain various types of errors while measurement, and important ways to eliminate them. 6
- (b) A wattmeter having a range of 500W has an error of ± 1.5 percent of full scale deflection. If the true power is 50W, what would be the range of the reading ? 4
- (c) Explain the purpose of calibrating an instrument and discuss the various calibrating instruments. 6

UNIT - II

- 2 (a) State the main requirements of slip gauges. How are slip gauges manufactured ? 8
- (b) Describe the constructional details of an angle Decker and explain how it is used to measure the angle. 8

OR

- 2 (a) Explain Reed type mechanical comparator. 4
- (b) Why is sine bar not suitable for measuring angles above 45° ? Also mention sources of errors in sine bar. 6
- (c) Describe briefly the construction and working principle of autocollimator. 6

UNIT - III

- 3 (a) Explain a method of measuring errors in the pitch of a screw thread. 8
- (b) Explain working of Parkinson gear tester with neat sketch. 8

OR

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- 3 (a) Explain how V-Block and three point probe are used for measurement of roundness. What are the limitations of V-Block ? 10
- (b) Explain Tomlinson surface meter in detail. 6

UNIT - IV

- 4 (a) Explain with the help of a neat sketch, the principle and working of laser interferometer. State its application in machine tool metrology. 12
- (b) Name the alignment tests performed on milling machine. 4

OR

- 4 Explain various types of coordinate measuring machines with a neat sketch. 16

UNIT - V

- 5 (a) Describe the construction of a hydraulic dynamometer and explain how it is used for power measurement ? 8
- (b) With a sketch explain the torque measurement using strain gauges. 8

OR

- 5 (a) Draw a simple sketch of a non-contact type temperature measuring instrument and describe each element. 8
- (b) With a neat sketch explain the velocity measurement using Hot Wire Anemometer. 8