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B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Mechanical Engineering
5ME3A Measurement & Metrology
Common With PI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates :

*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.*

Unit - I

1. a) List the various measurement methods and explain. **(8)**

   b) Describe the different types of errors in measurements and their respective causes. **(8)**

OR

1. a) Make a comparison between accuracy and precision. **(8)**

   b) Briefly discuss on calibration of temperature measuring devices with suitable examples. **(8)**

Unit - II

2. a) Differentiate the "Linear measuring instruments" and "Interval measuring instruments" with suitable examples. **(8)**

   b) Explain the working principle of mechanical comparator with neat sketch. **(8)**

OR

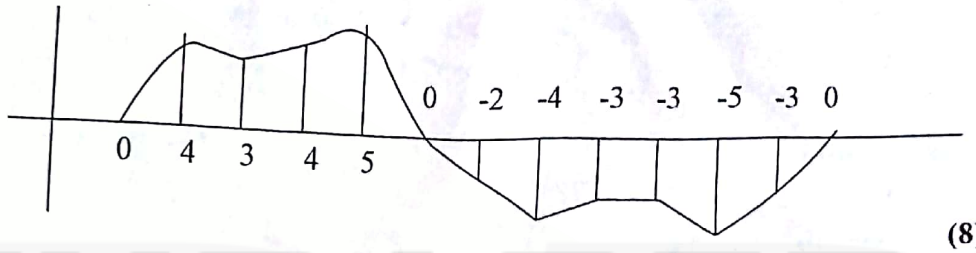
2. a) State and explain the "Taylor's principle" of gauge design. **(8)**

   b) Explain the principle and construction of an auto-collimator with neat sketch. **(8)**

Unit - III

3. a) Describe the two wire method of finding the effective diameter of screw threads. Given the figure below indicating stylus height values for a surface roughness measurement, find the Ra and Rq value. **(8)**

b)



(8)

OR

3. a) What are the various methods used for measuring the gear tooth thickness? Explain them with neat sketches. **(8)**

b) How to check the composite errors of the gear by using Parkinson gear testing machine? Explain it in detail? **(8)**

Unit - IV

4. With neat sketch explain the various types of CMM based on its construction. Write the advantages of computer aided inspection. **(16)**

OR

4. a) How the angle is measured using a laser interferometer? **(8)**

b) Explain the acceptance tests for surface grinders. **(8)**

Unit - V

5. a) State any four inferential types of flow meters. Briefly explain various methods of measuring flow. **(8)**

b) What is the principle involved in fluid expansion thermometer? Briefly explain various methods of measuring temperature. **(8)**

OR

5. Write short note on : Venturimeter, Pitot tube, Pyrometer and Rotameter. **(16)**
