

Code: ME5T4

III B.Tech - I Semester – Regular Examinations – November 2015

**ENGINEERING METROLOGY
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain the unilateral and bilateral systems of writing tolerances with suitable examples. Which system is preferred in interchangeable manufacturing? Why? 7 M
- b) Identify whether the following fits are hole based or shaft based. Convert them in to equivalent other system. 7 M
 - i) H7 – f8
 - ii) F6 - h4
 - iii) H5 - n4
 - iv) H7 - c6.
2. a) Explain the construction and uses of 7 M
 - i) Vernier caliper.
 - ii) Bevel protractor
- b) State the uses of: 7 M
 - i) Optical flat
 - ii) Angle plate
 - iii) V-block
 - iv) Straightedge
3. a) Explain the phenomenon of optical interference. 7 M

- b) Explain the working principle of a interferometer, state advantages and limitations of interferometry. 7 M
4. a) In the measurement of surface roughness, heights of 10 successive peaks and valleys were measured from a datum as follows: 35, 25, 40, 22, 35, 18, 42, 25, 35, 22 microns. If these measurements were obtained over length of 20mm determine the C.L.A and R.M.S values of the surfaces. 7 M
- b) Describe the principle and operation of Taylor-Hobson Talysurf surface roughness instrument. 7 M
5. a) With a neat sketch explain the construction & working of Sigma Comparator. 7 M
- b) What are the advantages & limitations of mechanical comparators. 7 M
6. With the help of sketch describe how tool maker's microscope can be used to measure the elements of screw threads. 14 M
7. a) Explain in detail the following methods of inspecting gear.
i) Concentricity & cylindricity
ii) Run out and axial slip. 7 M

b) Describe the method of checking of involute shape of gear.

7 M

8. a) What is meant by alignment tests on machine tools? Why they are necessary? Explain.

7 M

b) Explain various instruments required for performing the alignment tests on machine tools.

7 M