

Code: ME5T4

**III B.Tech - I Semester – Regular/Supplementary Examinations  
October 2017**

**ENGINEERING METROLOGY  
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22 M

1. a) List out different types of errors in measurement.
- b) Explain the principle and use of a spirit level.
- c) Explain the concept of interchangeability.
- d) Differentiate between Workshop gauges and Inspection gauges.
- e) State the Taylor's Principle of Gauge Design.
- f) Describe surface plate with reference to its construction, use and material.
- g) Differentiate the terms surface roughness and waviness.
- h) Name different types of gears with application.
- i) Draw a neat sketch by illustrating the nomenclature of external parallel screw threads.
- j) Describe the essential characteristics of a comparator.
- k) Name the various alignment tests to be performed on a lathe.

## PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Explain briefly the difference between the interchangeable manufacture and selective assembly. 6 M
- b) A hole and mating shaft are to have a nominal assembly size of 30 mm. The assembly is to have a maximum clearance of 0.15 mm and a minimum clearance of 0.05 mm. The hole tolerance is 1.5 times the shaft tolerance. Determine the limits for both hole and shaft by using (i) hole basis and (ii) shaft basis system. 10 M
3. a) State the principle of a micrometer. Sketch an outside micrometer and name its various parts. 8 M
- b) Explain the taper measurement method for checking the angle of taper using rollers, micrometer and slip gauge. 8 M
4. a) By using optical flat and monochromatic light explain the procedure to determine whether the given surface is flat or curved. 10 M

- b) Describe the principle and operation of Talysurf surface roughness instrument. 6 M
5. a) Describe a gear tooth vernier caliper and explain its use for checking chordal thickness and chordal addendum. 8 M
- b) What is the best wire size? Derive an expression for the same in terms of the pitch and angle of the thread. 8 M
6. a) Describe in brief the construction and working of a sigma comparator with the help of a neat sketch. 8 M
- b) Explain the method for checking whether the spindle axis is parallel to the bed in both the horizontal and vertical planes on a centre lathe. 8 M