

Code: ME5T4

**III B.Tech - I Semester – Regular/Supplementary Examinations
March - 2021**

**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) Why is it necessary to give tolerance on engineering dimensions?
- b) Why is unilateral tolerance preferred over bilateral tolerance? Explain in detail.
- c) Differentiate between clearance and Interference.
- d) What are the materials used for slip gauges?
- e) How do you find the least count of micrometre?
- f) Draw the symbol for surface finish as designated on drawings.
- g) What is the working principle of optical flat?
- h) List out various errors in screw thread.
- i) What is meant by back lash and run out in the spur gear?
- j) Distinguish between the comparator and gauge.
- k) What is the purpose of alignment tests on machine tools?

PART – B

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

2. a) Explain about hole and shaft basis systems with neat sketches. 8 M

b) Solve the problem given below using both hole and shaft basis systems and find the limits of sizes for hole and bearing: A 20mm diameter shaft and bearing are to be assembled with a clearance fit. The tolerance and allowances are as follows: Allowance = 0.002mm, Tolerance on hole = 0.005mm, Tolerance on shaft = 0.003mm. 8 M

3. a) Why is a Sine bar not used for generating angles greater than 45° , if high accuracy is needed? Explain it with a suitable graph. Explain the different sources of errors in Sine Bars. 8 M

b) Explain the principle of GO and NOGO gauges. Describe the necessity of Gauge maker's tolerance in gauge design. 8 M

4. a) Explain the construction and working of a Talysurf with a neat sketch. 8 M

- b) Explain the construction and working principle of autocollimator with a neat sketch. 8 M
5. a) Explain any two methods of measuring Gear Pitch. 8 M
- b) Explain the types of errors in screw thread and gear measurement. 8 M
6. a) Explain how a pneumatic comparator works and briefly enumerate the advantages of different pneumatic comparators. 8 M
- b) Briefly discuss the principles of machine tool alignment testing on milling machine with neat sketches. 8 M