**ANNA UNIVERSITY, CHENNAI-600 025**

**B.E/ B.Tech DEGREE EXAMINATIONS, Oct/Nov 2016**

**Regulations-2013**

**Fifth Semester**

**B.E. MECHANICAL ENGINEERING ME2308: Metrology and Measurements Lab**

**Time: 3 Hours Maximum Marks: 100**

1. Determine the taper angle of the given component using sine bar. (100)

2. Calibrate the vernier height gauge using slip gauges over the range 25 to 50 mm in steps of 5 mm and estimate the heights of the various features of the given component.

(100)

3. Calibrate the given vernier calliper in the range 0 – 50 mm using gauge blocks and determine the error involved in this range. (100)

4. Calibrate the given vernier calliper in the range 50 – 100 mm using gauge blocks and determine the error involved in this range. (100)

5. Calibrate the given micrometer in the range 0 – 20 mm using gauge blocks and determine the error involved in this range. (100)

6. Determine the semi-cone angle of the given component using sine center. (100)

7. Calculate and select the minimum number of slip gauges required for building up the required dimension, from the given set of slip gauges - 51.555, 63.975, 46.635, 26.76. Estimate the error introduced in the dimension 26.76 mm because of not using the minimum number of slip gauges using a mechanical comparator.

(100)

8. Determine the semi-cone angle of the given component using sine bar. (100)

9. Measure the depth of the given blind holes using depth gauge and vernier calliper. Take 3 readings along the hole. (100)

10. Determine the effective diameter of the given screw thread (using three wire method) using the given two wires and compare this with the theoretical value obtained using tool maker’s microscope. Comment on the difference between the two effective diameter obtained using the two wires. (100)

11. Determine the following parameters in a screw thread using tool maker’s microscope - (i)

minor diameter (ii) depth of thread (iii) pitch. (100)

12. Using gear tooth vernier calliper, determine the chordal tooth thickness of the given gear. (100)

13. Using gear tooth vernier calliper determine the tooth thickness of the gear at different heights from the tooth tip in steps of 0.2 mm and draw the profile of the gear tooth.

(100)

14. Determine the included angle of the given component using bevel protractor.

(100)

15. Determine the straightness along one edge of the machine tool guide way using autocollimator. Determine the maximum deviation from straightness using a reference line passing through the initial and final points. (100)

16. Use a thermocouple to measure the temperature of the given test specimen.

(100)

17. Determine the pitch diameter of the given screw thread using screw thread micrometer.

Determine the pitch and major diameter using vernier calliper and hence the pitch diameter and make a comparison. (100)

18. Determine the heights of the various features of the given component using a comparator and slip gauges. (100)

19. Determine the following parameters in the given metric screw thread using tool maker’s microscope – (i) major diameter (ii) depth of thread (iii) pitch. Calculate the effective diameter of this thread from the measured values. (100)

20. What is the principle used in the force measurement setup available in your laboratory.

Calibrate the force measurement setup, and plot a graph of error vs nominal force value. (100)

21. Calibrate the given displacement measurement setup by giving displacements in increments of 0.5 mm. Plot a graph of error vs Actual displacement. (100)

22. Measure the following parameters using the vibration measuring setup

(i) frequency

(ii) displacement

(iii) velocity

(iv) acceleration.

Plot the following curves

(1) Displacement vs Frequency

(2) Velocity vs Frequency

(3) AccelerationvsFrequency

(100)