Register Number: ……..

**B.E DEGREE EXAMINATIONS: APRIL/MAY 2014**

(Regulation 2009)

Fifth Semester

**MECHANICAL ENGINEERING**

MEC115**:** Engineering Metrology and Instrumentation

**Time: Three Hours** **Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. What is the unit for surface tension (σ) is
   a) $Kg/sec^2$ b) $Nm^2$
   c) Kg/sec d) $N/m^2$
2. The smallest difference in dimension that can be read on an instrument is called as
   a) Accuracy b) Linearity
   c) Sensitivity d) Precision
3. In following, which one is not the feature of comparators is
   a) Record variations of 0.0025mm b) Used to measure actual value differ from standard value
   c) Used to measures actual dimensions d) Measuring pressure is low and constant
4. From the following instruments, which one of the linear measurement
   a) Sine bar b) dial indicator
   c) steel rule d) ring gage
5. By using Replica method, which one is calculated in form measurement
   a) thickness b) surface finish
   c) radius d) flatness
6. Calculate the base tangent for a 20° pressure angle gear, having 45 teeth and a module of 4 mm
   a) 11.81 mm b) 5.905 mm
   c) 27.822 mm d) 55.643 mm
7. The first demonstrated laser is
   a) $CO_2$ laser b) He-Ne laser
   c) Pulsed ruby laser d) Semi- conductor laser
8. Streak interferometry is an example for
   a) Single-beam interferometry b) Two- beam interferometry



   c) three- beam interferometry d) multi- beam interferometry
9. In following, which is used to measure high temperatures
   a) Thermometer b) pyrometer
   c) bimetallic strips d) LVDT
10. The LVDT is used to measures
   a) Temperature b) pressure
   c) position d) speed

**PART B (10 x 2 = 20 Marks)**

11. What is Hysteresis?
12. Differentiate between Precision and Accuracy.
13. List out any four angular measuring instrument used in metrology
14. How the mechanical comparator is used? State with any one example.
15. Define runout?
16. What are the direct angular measurements methods?
17. Name the different types of interferometer.
18. Define grayscale analysis.
19. Give the principle of hot wire anemometer.
20. What is a Konometer?

**PART C (5 x 14 = 70 Marks)**

21. a) What is the need of calibration? Explain the classification of various measuring methods of reliability.

**(OR)**

b) Explain the various systematic and random errors in measurements.

22. a) What is auto collimator? With neat sketch explain the working principle of micro optic auto collimator

**(OR)**

b) Explain in detail of any four angular measuring instruments with neat sketch.

23. a) Explain in briefly about effective diameter measurement with neat sketch.

**(OR)**

b) Briefly explain about the following surface finish methods.

(i) Tomlinson surface meter (7)

(ii) Taylor- Hobson talysurf (7)

24. a) Explain in detail about the working principle, advantages and applications of He-Ne and $CO_2$ lasers with neat sketch

**(OR)**

b) Explain the various types of coordinate measuring machines with neat sketch and briefly explain about its need, construction and applications.

25. a) Briefly explain about temperature measuring instruments with neat sketch

**(OR)**

b) Explain in briefly about pressure measuring instruments with neat sketch

**********