

**FACULTY OF ENGINEERING**  
**B.E. 4/4 (M/P) First Semester (Suppl.) Examination, June/July 2011**  
**METROLOGY AND INSTRUMENTATION**

Time: Three Hours]

[Maximum Marks : 75

**Note :—** Answer ALL questions from Part A. Answer any FIVE questions from Part B.

**PART—A (Marks : 10×2.5=25)**

1. Discuss the function and principle of ratchet mechanism in a micrometer.
2. What are the advantages of differential pneumatic comparator ?
3. Explain the terms Gauge maker's tolerance and Limit gauge.
4. What is unilateral and bilateral tolerances ?
5. How will you go about checking the accuracy of a gear tooth vernier caliper ?
6. Sketch optical path of a profile projector and discuss its important use.
7. Describe 3-methods of testing straight-edge one meter long.
8. What are the types of materials used in thermocouples ?
9. What is load cell and how it works ?
10. What is Rosette gauge ?

**PART—B (Marks : 5×10=50)**

11. (a) What are the basic principles that should be observed in the design of instruments and gauges ? 5  
(b) How slip gauges are manufactured ? Give detailed process. 5
12. (a) Determine the dimensions and tolerances of shaft and hole having size 30 H<sub>7</sub>/h<sub>8</sub> fit. 5  
(b) Determine the minimum clearance and maximum clearance for the same fit. 5
13. (a) Explain how pneumatic comparator works ? 5  
(b) Give advantages of differential pneumatic comparators. 5

14. (a) Derive an expression for best size wire. 5  
(b) What are the two corrections applied in the measurement of effective diameter by the method of wires ? 5
15. (a) Explain the principle and operation of Parkinson Gear Tester with a neat sketch. 5  
(b) What are the elements of gears to be checked for accuracy ? 5
16. (a) Explain the use of extension wires in thermocouples. 5  
(b) Define ambient temperature compensation. 5
17. Explain the working principle of the following :—  
(a) Pirani gauge  
(b) Piezoelectric force transducer. 10