USN | | | | | | | | | | |

10ME/AU32B

Third Semester B.E. Degree Examination, June/July 2014
Mechanical Measurements and Metrology

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Sketch and explain the following:
   i) Impherial standard.
   ii) International prototype. **(08 Marks)**

b. Discuss the following standards of measurements with their characteristics:
   i) Line standard.
   ii) END standard. **(08 Marks)**

c. What are the major requirements of slip gauges? **(04 Marks)**

2 a. Define the following with sketch:
   i) Nominal size.
   ii) Basic size.
   iii) Actual size.
   iv) Zero line.
   v) Allowance.
   vi) Fit. **(09 Marks)**

b. Differentiate between hole basis and shalt basis system with sketches. **(07 Marks)**

c. How the plain gauges are classified? **(04 Marks)**

3 a. List the characteristics of a comparator. **(06 Marks)**

b. Explain with sketch the principle of a sine bar. **(06 Marks)**

c. Give the combination of angle gauges to obtain the following angles also sketch the arrangement of gauges: i) 37° 9′ 18″ ; ii) 33° 16′ 42″. **(08 Marks)**

4 a. Describe with sketch 3-wire method of measuring effective diameter of the thread. **(10 Marks)**

b. Explain with sketch measurement of tooth thickness of a spur gear using gear tooth Vernier Caliper. **(10 Marks)**

PART – B

5 a. What is measurement? Explain the fundamental methods of measurement. **(06 Marks)**

b. Explain:
   i) Repeatability.
   ii) Sensitivity.
   iii) Hysteresis. **(06 Marks)**

c. With suitable example, explain the stages of generalized measurement system **(08 Marks)**

6 a. Explain with block diagram working of a general purpose oscilloscope. **(10 Marks)**

b. Explain with sketch:

i) Stylus type oscillograph.

ii) Light beam oscillograph. **(10 Marks)**

7 a. Describe with a neat sketch the working and applications of a proving ring. **(06 Marks)**

b. With a neat sketch, explain the working of a hydraulic dynamometer for the measurement of torque. **(07 Marks)**

c. Explain the Bridgemen gauge with a neat sketch. **(07 Marks)**

8 a. Write a note on thermocouple materials. **(03 Marks)**

b. With a neat sketch, explain the working of a optical pyrometer. **(08 Marks)**

c. Show with sketch how the strain gauges are mounted to measure in the following cases:

i) Axial strain only.

ii) Bending strain only.

iii) Torsion strain only. **(09 Marks)**

* * * * *