

B.Tech IV Year I Semester (R13) Regular Examinations November/December 2016

**METROLOGY & MEASUREMENTS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define unilateral and bilateral tolerances. Give example for each.
  - What is function of comparator? Give the classification of comparators.
  - List out non-precision and precision measuring instruments used in linear measurement.
  - Classify the errors. What is relative error?
  - What are the considerations while manufacturing the slip gauges?
  - Define the effective diameter of a screw thread with a neat sketch.
  - What is transducer? Give the classification of transducer.
  - What is tachometer? What are practical applications of tachometer?
  - What are thermocouples? List out various advantages.
  - McLeod Pressure gauge works on which law? State the law.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 The tolerances for a hole and shaft assembly having a nominal size of 50 mm are as follows:

$$\text{Hole} = 40^{+0.021}_{+0.000} \text{ mm and shaft} = 40^{-0.040}_{-0.075} \text{ mm}$$

Determine:

- Maximum and minimum clearances.
- Tolerances on shaft and hole.
- Allowance.
- MML of hole and shaft.
- Type of fit.

**OR**

- 3 With the help of a neat sketch, explain the working principle of a mechanical comparator.

**UNIT – II**

- 4 Write a short note on how can the following devices measure:

- Slip gauges.
- Vernier Height gauge.

**OR**

- 5 Explain in detail the working of the Sin Bar to measure unknown angle.

**UNIT – III**

- 6 Explain the following methods of qualifying surface roughness:

- Rz value.
- RMS value.
- Ra value.

**OR**

- 7 With the help of an illustration, explain any three alignment tests on lathe.

**UNIT – IV**

- 8 With the help of an illustration, explain inductive-type transducer and capacitance transducer.

**OR**

- 9 Write short notes on:

- Tachometer.
- Strain Rosette for strain measurement.

**UNIT – V**

- 10 State and explain the different laws of thermocouples and also list out the different thermocouple materials with their designation.

**OR**

- 11 Discuss the McLeod Pressure gauge in detail.

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