B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

Term-End Examination, 2019

BME-014 : METROLOGY AND INSTRUMENTATION

Time : 3 Hours   Maximum Marks : 70

Note : Answer **any seven** questions. All questions carry equal marks. Use of scientific calculator is permitted.

1. (a)   Differentiate between primary and secondary standards.   [4]

    (b)   What are the SI units of the following quantities:[3]

           (i)   Angular velocity

           (ii)   Resistance

           (iii) Inductance

           (iv)   Current

           (v)   Thermodynamic Temperature

           (vi)   Luminous intensity of light

(c)   The thermal conductivity of a metal is 0.3 cal/ cm.sec. °C. Find its value in SI units.   [3]

2.   What are the parts of Vernier Height Gauge ? Explain its working with a neat sketch.   [10]

3.   Name the commonly used gauges in Production work. Illustrate the application of any two with a neat sketch.[10]

4.   Give brief description about important parts of a Co-ordinate Measuring Machine (CMM).   [10]

5.   (a)   Explain the following terms with the help of neat diagram :   [5]

        (i)   Clearance fit

        (ii)   Transition fit

        (iii)   Interference fit

    (b)   Define tolerance. What are unilateral and bilateral tolerance ? Find the type of fit for a pair of shafts defined as follows :   [5]

        shaft dia : $100 \begin{smallmatrix} +\,0.055 \\ +\,0.050 \end{smallmatrix}$

        hole dia : $100 \begin{smallmatrix} +\,0.050 \\ -\,0.025 \end{smallmatrix}$

6. What are the different types of comparators ? Explain the optical comparator in brief. [10]

7. What is a sine bar ? How is it used to measure an angle between two surfaces ? Could you measure all angles with this arrangement ? Explain. [10]

8. Describe autocollimator. On what principles does it work ? Write the applications. [10]

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