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Printed Pages – 3 TME – 404

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4082 Roll No. | | | | | | | | | | |

**B.Tech.**

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

## MEASUREMENT, METROLOGY AND CONTROL

*Time : 3 Hours* *Total Marks : 100*

**Note :** *(i) Attempt **all** questions.*

*(ii) Assume any missing data suitably.*

**1.** Attempt **any four** of the following : **(4x5=20)**

(a) Explain the difference between active and passive transducer.

(b) Define uncertainty in measurement. Discuss some major sources of error in measurement.

(c) With a suitable example explain the difference between accuracy and precision.

(d) Briefly discuss the various input signals used in measuring instruments.

(e) Find the dynamic response of a first order system to a ramp input signal and explain delay time, rise time and maximum overshoot.

(f) Draw the response of a second order system for a step signal.

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2. Attempt **any four** of the following : **(4x5=20)**

(a) With a neat sketch explain the working of a dead weight gauge tester.

(b) Discuss any two elastic transducer which are used for pressure measurement.

(c) What is stroboscope ? Explain its working principle.

(d) Show that the sensitivity of an analytical balance is independent of the weight.

(e) Discuss the working of a pony brake dynamometer. What are its disadvantages ?

(f) What surface temperature of a black body is needed to radiate 120 $W/m^2$ ?

3. Attempt **any two** of the following : **(2x10=20)**

(a) Distinguish between 'line standard' and 'end standard'. How are end standards derived from line standards ? Give examples for these two types of standards.

(b) Describe the various mechanisms to obtain high magnification in dial indicators.

(c) Explain the Taylor's principle as applied to limiting gauge. Use at least two examples of Go and Not - Go gauges demonstrate the application.

4. Attempt **any two** of the following : **(2x10=20)**

(a) Discuss how would you proceed to check
(i) flatness, (ii) squareness
(iii) roundness.
Also explain the flatness testing using autocollimator method.



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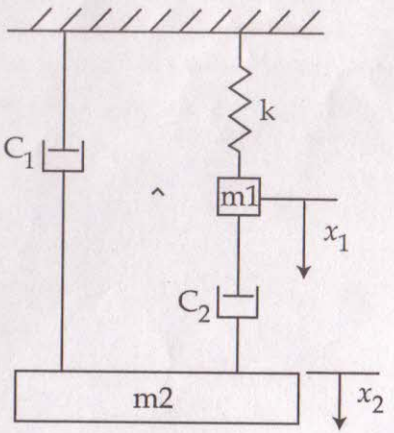
(b) Explain the principle of measurement by light interference method. How flatness errors of lapped surfaces are measured with an optical flat ?

(c) Describe the methods for numerical assessment of surface texture. Give an example where the RMS value of surface texture is generally used for specifying the finish.

3. Attempt **any two** of the following : **(2x10=20)**

(a) Find the inverse Laplace transform of the following function
$F(s) = (s^2+2s+3)/(s+1)^3$.

(b) Determine the transfer function of the given mechanical system with two degree of freedom.




(c) With a neat sketch explain the basic principle of pneumatic proportion controller. Show its block diagram and find the transfer function of the system.

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