Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech
PCME4403

Seventh Semester Examination – 2013

MECHANICAL MEASUREMENT CONTROL

BRANCH : MECH

QUESTION CODE : C- 223

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) What is the difference between precision and accuracy ?

(b) Distinguish between analog and digital transducers.

(c) Explain the terms hysterisis and drift.

(d) Distinguish between inductive transducers and capacitive transducers.

(e) Briefly mention the basic principle of piezoelectric transducers.

(f) What do you mean by static and dynamic error coefficient ?

(g) Define open-Loop and closed-loop control systems.

(h) What do you mean by servo mechanism ?

P.T.O.

(i) Distinguish between transient response and steady state response.

(j) Distinguish between vibrometers and accelerometers.

2. (a) With a neat sketch, explain the construction and working principle of Cathode Ray Oscilloscope describing its salient features. 8

(b) Why intermediate modifying systems are required in mechanical measurements ? 2

3. (a) With a neat sketch, describe the strain gage bridge circuit for strain measurement. Explain the temperature compensation for strain gage bridges. 8

(b) What is a strain rosette ? Explain with suitable diagram. 2

4. (a) Explain the principle of operation of a LVDT and sketch the input-output graph. Discuss its merits and demerits. 8

(b) What are the requirements for terminating devices ? Explain through block diagrams. 2

5. (a) Broadly classify the pressure measuring transducers. With a neat sketch explain the working of a McLeod Gage for measurement of very low pressure. 8

(b) Explain the working principle of Bulk modulus pressure gauge. 2

6. (a) Explain the principle of working of thermocouples. State the law of intermediate temperatures and intermediate metals for thermocouples. Name the materials used for thermocouples. 8

(b) Explain the term pyrometry with a diagram. 2

7. (a) Explain the principle of variable area meters for flow measurement. 2

(b) Compare the relative merits and demerits of venturimeter, nozzle meter and orifice meter together with their sketches. 8

8. (a) Examine the stability of the characteristic polynomial for K ranging from 0 to ∞. 8

$$D(s) = S^4 + 20\,KS^3 + 5S^2 + 10\,S + 15$$

(b) What is Mason's Gain formula ? Explain its various terms. 2