Code No: R05321402 **R05** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
INSTRUMENTATION AND CONTROL SYSTEMS
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Identify the components, input and output and describe the operation of a biological control system consisting of a human being reaching the push button of an electric bell.
   (b) Distinguish between open-loop and closed-loop control systems with the help of a suitable diagram .Illustrate your answer using block diagram schematics. [8+8]
2. (a) Classify measuring instruments.
   (b) Discuss the dynamic response characteristics of second order instruments to step input for critical damping condition. [6+10]
3. Describe the following:
   (a) Working principle of Centrifugal speed tachometer
   (b) Working principle of Vibration reed tachometer
   (c) Revolution counter. [6+6+4]
4. (a) Explain by means of neat sketches different arrangements for lead wire compensation in R.T.D.
   (b) What are thermisters? How are they different from R.T.D.? Explain the working of thermister thermometer. [8+8]
5. (a) Define the various terms related to humidity.
   (b) What are the hygroscopic materials? Explain the working of any one of the absorption hygrometers. [8+8]
6. (a) Describe with a neat diagram Bourdon-tube pressure gauge and explain its working.
   (b) Distinguish between static pressure and stagnation pressure.
   (c) Sketch the various shapes of bellows used for pressure measurement. [8+4+4]
7. (a) With a neat sketch explain the working principle of a bubbler gauge
   (b) Describe construction and working of an Electromagnetic flow meter. Explain its advantages and disadvantages. [6+10]
8. (a) What do you understand by strain gauge rosettes and the need for them?

(b) Three strain gauges in the form of a delta rosette were attached to a specimen to finds strain. The readings of three gauges are ε_1=800, ε_2=400, ε_3=0. Determine the principal strains, principal stresses and the location of principal plane. Assume E=$680 \times 102 N/mm^2$ and ν =0.33. [6+10]

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Code No: R05321402 **R05** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
INSTRUMENTATION AND CONTROL SYSTEMS
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) With a neat sketch explain the working principle of a bubbler gauge
   (b) Describe construction and working of an Electromagnetic flow meter. Explain its advantages and disadvantages. [6+10]
2. (a) Explain by means of neat sketches different arrangements for lead wire compensation in R.T.D.
   (b) What are thermisters? How are they different from R.T.D.? Explain the working of thermister thermometer. [8+8]
3. (a) Define the various terms related to humidity.
   (b) What are the hygroscopic materials? Explain the working of any one of the absorption hygrometers. [8+8]
4. (a) What do you understand by strain gauge rosettes and the need for them?
   (b) Three strain gauges in the form of a delta rosette were attached to a specimen to finds strain. The readings of three gauges are ε_1=800, ε_2=400, ε_3=0. Determine the principal strains, principal stresses and the location of principal plane. Assume E=$680 \times 102 N/mm^2$ and ν =0.33. [6+10]
5. (a) Classify measuring instruments.
   (b) Discuss the dynamic response characteristics of second order instruments to step input for critical damping condition. [6+10]
6. (a) Describe with a neat diagram Bourdon-tube pressure gauge and explain its working.
   (b) Distinguish between static pressure and stagnation pressure.
   (c) Sketch the various shapes of bellows used for pressure measurement. [8+4+4]
7. (a) Identify the components, input and output and describe the operation of a biological control system consisting of a human being reaching the push button of an electric bell.
   (b) Distinguish between open-loop and closed-loop control systems with the help of a suitable diagram .Illustrate your answer using block diagram schematics. [8+8]
8. Describe the following:
   (a) Working principle of Centrifugal speed tachometer

(b) Working principle of Vibration reed tachometer

(c) Revolution counter. [6+6+4]

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Code No: R05321402 **R05** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
INSTRUMENTATION AND CONTROL SYSTEMS
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Describe the following:
   (a) Working principle of Centrifugal speed tachometer
   (b) Working principle of Vibration reed tachometer
   (c) Revolution counter. [6+6+4]
2. (a) Describe with a neat diagram Bourdon-tube pressure gauge and explain its working.
   (b) Distinguish between static pressure and stagnation pressure.
   (c) Sketch the various shapes of bellows used for pressure measurement. [8+4+4]
3. (a) Classify measuring instruments.
   (b) Discuss the dynamic response characteristics of second order instruments to step input for critical damping condition. [6+10]
4. (a) With a neat sketch explain the working principle of a bubbler gauge
   (b) Describe construction and working of an Electromagnetic flow meter. Explain its advantages and disadvantages. [6+10]
5. (a) Identify the components, input and output and describe the operation of a biological control system consisting of a human being reaching the push button of an electric bell.
   (b) Distinguish between open-loop and closed-loop control systems with the help of a suitable diagram .Illustrate your answer using block diagram schematics. [8+8]
6. (a) Define the various terms related to humidity.
   (b) What are the hygroscopic materials? Explain the working of any one of the absorption hygrometers. [8+8]
7. (a) Explain by means of neat sketches different arrangements for lead wire compensation in R.T.D.
   (b) What are thermisters? How are they different from R.T.D.? Explain the working of thermister thermometer. [8+8]
8. (a) What do you understand by strain gauge rosettes and the need for them?

(b) Three strain gauges in the form of a delta rosette were attached to a specimen to finds strain. The readings of three gauges are ε_1=800, ε_2=400, ε_3=0. Determine the principal strains, principal stresses and the location of principal plane. Assume E=$680 \times 102 N/mm^2$ and ν =0.33. [6+10]

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Code No: R05321402 **R05** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
INSTRUMENTATION AND CONTROL SYSTEMS
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Describe the following:
   (a) Working principle of Centrifugal speed tachometer
   (b) Working principle of Vibration reed tachometer
   (c) Revolution counter. [6+6+4]
2. (a) Define the various terms related to humidity.
   (b) What are the hygroscopic materials? Explain the working of any one of the absorption hygrometers. [8+8]
3. (a) Describe with a neat diagram Bourdon-tube pressure gauge and explain its working.
   (b) Distinguish between static pressure and stagnation pressure.
   (c) Sketch the various shapes of bellows used for pressure measurement. [8+4+4]
4. (a) Classify measuring instruments.
   (b) Discuss the dynamic response characteristics of second order instruments to step input for critical damping condition. [6+10]
5. (a) Identify the components, input and output and describe the operation of a biological control system consisting of a human being reaching the push button of an electric bell.
   (b) Distinguish between open-loop and closed-loop control systems with the help of a suitable diagram .Illustrate your answer using block diagram schematics. [8+8]
6. (a) With a neat sketch explain the working principle of a bubbler gauge
   (b) Describe construction and working of an Electromagnetic flow meter. Explain its advantages and disadvantages. [6+10]
7. (a) What do you understand by strain gauge rosettes and the need for them?
   (b) Three strain gauges in the form of a delta rosette were attached to a specimen to finds strain. The readings of three gauges are ε_1=800, ε_2=400, ε_3=0. Determine the principal strains, principal stresses and the location of principal plane. Assume E=$680 \times 102 N/mm^2$ and ν =0.33. [6+10]
8. (a) Explain by means of neat sketches different arrangements for lead wire compensation in R.T.D.

(b) What are thermisters? How are they different from R.T.D.? Explain the working of thermister thermometer. [8+8]

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