

Code No: R05410304

**R05****Set No. 2**

**IV B.Tech I Semester Examinations, November 2010  
INSTRUMENTATION AND CONTROL SYSTEMS**

**Common to Mechanical Engineering, Automobile Engineering**

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

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. (a) By means of at least two examples explain terms.
  - i. Desired inputs
  - ii. modifying inputs
  - iii. interfering inputs
  - iv. output
 (b) How are the effects of modifying inputs and interfering inputs eliminated by method of opposing inputs. Explain by means of an example. [8+8]
2. (a) Describe about the strain gauges on rotating shafts.  
 (b) What are driving dynamometers? With suitable diagrams, explain how a flash light torsion dynamometer works. [8+8]
3. (a) Explain the working of elementary accelerometers like
  - i. Vibrating wedge
  - ii. Cantilever.
 Describe how vibrations are measured by each  
 (b) Explain the construction, principle of working and advantages of Capacitance vibration sensor accelerometers. [10+6]
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) What is the temperature compensation with respect to strain gauges?  
 (b) Explain how an unbonded strain gauge is used to measure strain?  
 (c) List the essential characteristics required for the backing material of a bonded strain gauge. [6+6+4]
6. (a) List the requirements of a control system  
 (b) Propose a control system to fill a container with water after it is emptied through a stop cock at the bottom. The system must automatically shut off the water when the container is filled. Draw the block diagram of the proposed system. Which component or components comprise the plant, the controller and feed back. [4+12]
7. (a) What are thermopiles? What are their advantages?

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- (b) Explain by means of neat sketches, the working of Total radiation pyrometer. [6+10]
8. (a) Describe the use of a simple U-tube manometer. Discuss the various modifications needed to increase its sensitivity, accuracy.
- (b) Discuss the merits and demerits of elastic sensing elements. [12+4]

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**R05****Set No. 4**

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

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1. (a) What is the temperature compensation with respect to strain gauges?  
(b) Explain how an unbonded strain gauge is used to measure strain?  
(c) List the essential characteristics required for the backing material of a bonded strain gauge. [6+6+4]
2. (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]
3. (a) By means of at least two examples explain terms.
  - i. Desired inputs
  - ii. modifying inputs
  - iii. interfering inputs
  - iv. output
 (b) How are the effects of modifying inputs and interfering inputs eliminated by method of opposing inputs. Explain by means of an example. [8+8]
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(b) What are driving dynamometers? With suitable diagrams, explain how a flash light torsion dynamometer works. [8+8]
5. (a) List the requirements of a control system  
(b) Propose a control system to fill a container with water after it is emptied through a stop cock at the bottom. The system must automatically shut off the water when the container is filled. Draw the block diagram of the proposed system. Which component or components comprise the plant, the controller and feed back. [4+12]
6. (a) What are thermopiles? What are their advantages?  
(b) Explain by means of neat sketches, the working of Total radiation pyrometer. [6+10]
7. (a) Explain the working of elementary accelerometers like
  - i. Vibrating wedge
  - ii. Cantilever.
 Describe how vibrations are measured by each

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- (b) Explain the construction, principle of working and advantages of Capacitance vibration sensor accelerometers. [10+6]
8. (a) Describe the use of a simple U-tube manometer. Discuss the various modifications needed to increase its sensitivity, accuracy.
- (b) Discuss the merits and demerits of elastic sensing elements. [12+4]

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**R05****Set No. 1**

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1. (a) What is the temperature compensation with respect to strain gauges?  
 (b) Explain how an unbonded strain gauge is used to measure strain?  
 (c) List the essential characteristics required for the backing material of a bonded strain gauge. [6+6+4]
2. (a) What are thermopiles? What are their advantages?  
 (b) Explain by means of neat sketches, the working of Total radiation pyrometer. [6+10]
3. (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]
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 (b) What are driving dynamometers? With suitable diagrams, explain how a flash light torsion dynamometer works. [8+8]
6. (a) By means of at least two examples explain terms.
  - i. Desired inputs
  - ii. modifying inputs
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  - iv. output
 (b) How are the effects of modifying inputs and interfering inputs eliminated by method of opposing inputs. Explain by means of an example. [8+8]
7. (a) Explain the working of elementary accelerometers like
  - i. Vibrating wedge
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 Describe how vibrations are measured by each  
 (b) Explain the construction, principle of working and advantages of Capacitance vibration sensor accelerometers. [10+6]

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8. (a) List the requirements of a control system
- (b) Propose a control system to fill a container with water after it is emptied through a stop cock at the bottom. The system must automatically shut off the water when the container is filled. Draw the block diagram of the proposed system. Which component or components comprise the plant, the controller and feed back. [4+12]

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**R05****Set No. 3**

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1. (a) What is the temperature compensation with respect to strain gauges?  
 (b) Explain how an unbonded strain gauge is used to measure strain?  
 (c) List the essential characteristics required for the backing material of a bonded strain gauge. [6+6+4]
2. (a) List the requirements of a control system  
 (b) Propose a control system to fill a container with water after it is emptied through a stop cock at the bottom. The system must automatically shut off the water when the container is filled. Draw the block diagram of the proposed system. Which component or components comprise the plant, the controller and feed back. [4+12]
3. (a) Explain the working of elementary accelerometers like
  - i. Vibrating wedge
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 Describe how vibrations are measured by each  
 (b) Explain the construction, principle of working and advantages of Capacitance vibration sensor accelerometers. [10+6]
4. (a) Describe the use of a simple U-tube manometer. Discuss the various modifications needed to increase its sensitivity, accuracy.  
 (b) Discuss the merits and demerits of elastic sensing elements. [12+4]
5. (a) What are thermopiles? What are their advantages?  
 (b) Explain by means of neat sketches, the working of Total radiation pyrometer. [6+10]
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) By means of at least two examples explain terms.
  - i. Desired inputs
  - ii. modifying inputs
  - iii. interfering inputs
  - iv. output

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- (b) How are the effects of modifying inputs and interfering inputs eliminated by method of opposing inputs. Explain by means of an example. [8+8]
8. (a) Describe about the strain gauges on rotating shafts.
- (b) What are driving dynamometers? With suitable diagrams, explain how a flash light torsion dynamometer works. [8+8]

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