

Code No: R05322304

R05**Set No. 2**

III B.Tech II Semester Examinations, December 2010
INSTRUMENTATION AND PROCESS CONTROL
Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Write a short notes on

- (a) Range ability
- (b) Linear valve
- (c) Sensitivity.

[5+6+5]

2. A servo system for position control has the closed loop transfer function $\frac{6}{s^2+2s+6}$. Find the percentage overshoot if the input is suddenly moved to new position? [16]

3. (a) Discuss the effects of integral controller on the closed loop response of first order systems.

(b) Explain the principle of derivative control action with neat sketches. [8+8]

4. In the following figure 3 P1, P2 and P3 refer to changes in the pressure upstream, in the tank and down-stream respectively and the tank pressure influences the flows into and out of tank.

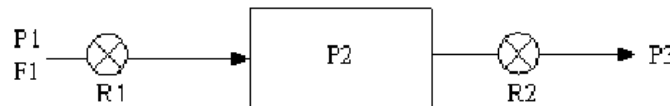


Figure 3

(a) Write the differential equations for the above system and the transfer function.

(b) What is the order of the above system?

How will the order change if there are several inlets and outlets? [8+8]

5. Explain in detail about the cohen and coon rules[c-c] for open loop method and explain the construction of the process reaction curve? [16]

6. Three identical tanks are operated in series in non-interacting fashion. For each tank $R=1$ and $\tau=1$. If the deviation in the flow rate to the first tank is an impulse function of magnitude 2, determine

(a) An expression for $H(s)$. Where H is deviation in level in third tank.

(b) Obtain the expression for $H(t)$

(c) Sketch the response curve. [8+6+2]

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7. Describe the electronic PID controller with circuit and relevant equations. [16]
8. Explain with a neat diagram the split range control of the pressure in steam header? [16]

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R05**Set No. 4**

III B.Tech II Semester Examinations, December 2010
INSTRUMENTATION AND PROCESS CONTROL
Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Explain in detail about the Cohen and Coon rules [c-c] for open loop method and explain the construction of the process reaction curve? [16]
2. In the following figure 3 P1, P2 and P3 refer to changes in the pressure upstream, in the tank and down-stream respectively and the tank pressure influences the flows into and out of tank.

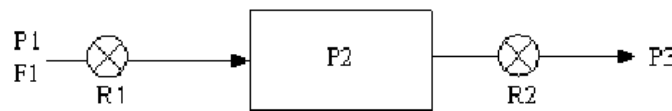


Figure 3

- (a) Write the differential equations for the above system and the transfer function.
 - (b) What is the order of the above system?
How will the order change if there are several inlets and outlets? [8+8]
3. A servo system for position control has the closed loop transfer function $\frac{6}{s^2+2s+6}$. Find the percentage overshoot if the input is suddenly moved to new position? [16]
 4. Write a short notes on
 - (a) Range ability
 - (b) Linear valve
 - (c) Sensitivity. [5+6+5]
 5. Describe the electronic PID controller with circuit and relevant equations. [16]
 6. (a) Discuss the effects of integral controller on the closed loop response of first order systems.
(b) Explain the principle of derivative control action with neat sketches. [8+8]
 7. Three identical tanks are operated in series in non-interacting fashion. For each tank $R=1$ and $\tau=1$. If the deviation in the flow rate to the first tank is an impulse function of magnitude 2, determine
 - (a) An expression for $H(s)$. Where H is deviation in level in third tank.
 - (b) Obtain the expression for $H(t)$

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(c) Sketch the response curve.

[8+6+2]

8. Explain with a neat diagram the split range control of the pressure in steam header?
[16]

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R05**Set No. 1**

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INSTRUMENTATION AND PROCESS CONTROL
Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Explain in detail about the Cohen and Coon rules [c-c] for open loop method and explain the construction of the process reaction curve? [16]
2. A servo system for position control has the closed loop transfer function $\frac{6}{s^2 + 2s + 6}$. Find the percentage overshoot if the input is suddenly moved to new position? [16]
3. Describe the electronic PID controller with circuit and relevant equations. [16]
4. (a) Discuss the effects of integral controller on the closed loop response of first order systems.
 (b) Explain the principle of derivative control action with neat sketches. [8+8]
5. Write a short notes on
 (a) Rangeability
 (b) Linear valve
 (c) Sensitivity. [5+6+5]
6. Explain with a neat diagram the split range control of the pressure in steam header? [16]
7. In the following figure 3 P1, P2 and P3 refer to changes in the pressure upstream, in the tank and down-stream respectively and the tank pressure influences the flows into and out of tank.

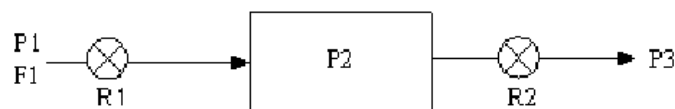


Figure 3

- (a) Write the differential equations for the above system and the transfer function.
 - (b) What is the order of the above system?
 How will the order change if there are several inlets and outlets? [8+8]
8. Three identical tanks are operated in series in non-interacting fashion. For each tank $R=1$ and $\tau=1$. If the deviation in the flow rate to the first tank is an impulse function of magnitude 2, determine

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- (a) An expression for $H(s)$. Where H is deviation in level in third tank.
- (b) Obtain the expression for $H(t)$
- (c) Sketch the response curve. [8+6+2]

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R05**Set No. 3**

III B.Tech II Semester Examinations, December 2010
INSTRUMENTATION AND PROCESS CONTROL
Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Write a short notes on

- (a) Range ability
- (b) Linear valve
- (c) Sensitivity.

[5+6+5]

2. Describe the electronic PID controller with circuit and relevant equations. [16]

3. In the following figure 3 P1, P2 and P3 refer to changes in the pressure upstream, in the tank and down-stream respectively and the tank pressure influences the flows into and out of tank.

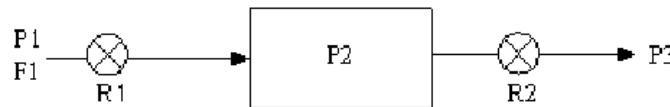


Figure 3

- (a) Write the differential equations for the above system and the transfer function.
- (b) What is the order of the above system?

How will the order change if there are several inlets and outlets? [8+8]

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(b) Explain the principle of derivative control action with neat sketches. [8+8]

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(a) An expression for $H(s)$. Where H is deviation in level in third tank.

(b) Obtain the expression for $H(t)$

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(c) Sketch the response curve.

[8+6+2]

8. Explain with a neat diagram the split range control of the pressure in steam header?
[16]

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