Code :R5322304

R5

III B.Tech II Semester(R05) Supplementary Examinations, April/May 2011
INSTRUMENTATION & PROCESS CONTROL
(Biotechnology)

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

Answer any FIVE questions
All questions carry equal marks

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1. (a) Show that the mercury thermometer, which is suddenly immersed in hot water at some temperature, will follow first order dynamics.
   (b) A thermometer which is at 50^0 C initially is immersed in a bath maintained at 80^0 C at t=0. Determine the temperature reading at 1.0 min and 1.2 min.
2. (a) Say whether heated tank and an immersed thermometer with negligible interaction is interacting or non interacting? Justify your answer.
   (b) Write the differential equations and determine the transfer functions individually for heated tank and thermometer and determine the over all transfer function of this combination.
3. (a) Explain briefly the proportional, proportional integral and proportional integral derivative control with expressions for transfer functions.
   (b) With a neat sketch, give a comparative study of the responses of above three controller types.
4. In a PID controller the error is increased linearly at the rate of 5^0 per minute. Proportional sensitivity is 4, reset rate is 1 and the derivative time is 0.5. Obtain the response and sketch P (t) Vs t.
5. Write a short notes on:
   (a) Continuous cycling method
   (b) Reaction curve method
6. What is a optimum-tuning of control system? What are its different approaches?
7. (a) What is flashing problem?
   (b) Differentiate between electric & hydraulic actuators.
8. What is cascade control? Explain with neat sketch?

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