

III B.Tech I Semester Supplementary Examinations, April/May 2005
PROCESS CONTROL INSTRUMENTATION
(Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

1. Name five flow laws relating to fluids, heat and electricity and state these laws.
2. (a) Is the Thermometer Bulb and well arrangement a non-interacting system? Justify your answer.
(b) Write the differential equations and determine the transfer function for Thermometer bulb and well arrangement.
3. (a) what is meant by differential gap and how it is related to the performance of the final control element?
(b) Define proportional band. Explain the relation between proportional gain, proportional band and offset error.
(c) With a neat sketch explain the integral controller mode action. Summarize the characteristics.
4. (a) Explain the method of realizing an electronic PI controller employing delayed positive feedback. Derive the expression for proportional gain and integral time.
(b) Explain with a neat sketch, the working principle of a moving vane type two position controller.
5. (a) Describe the following types of disturbances with relevant sketches.
 - i. Transient
 - ii. Set point changes
 - iii. Load changes.
(b) Write a short note on the following errors.
 - i. IAE.
 - ii. ISE .
 - iii. ITAE.
6. (a) Explain the baffle - Nozzle system with the help of its characteristic curves.
(b) Explain the pneumatic booster and what is its need.
(c) Differentiate between direct and reverse action final control operation.
7. Write steps followed in choosing a valve for better control of flow and should be cost effective

8. Explain feed forward control for the following

- (a) Heat exchangers
- (b) Drum boiler
- (c) Distillation column

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