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Question Paper Code : 31429

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electronics and Instrumentation Engineering

EI 2352/EI 62/10133 EI 602 – PROCESS CONTROL

(Common to Instrumentation and Control Engineering)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

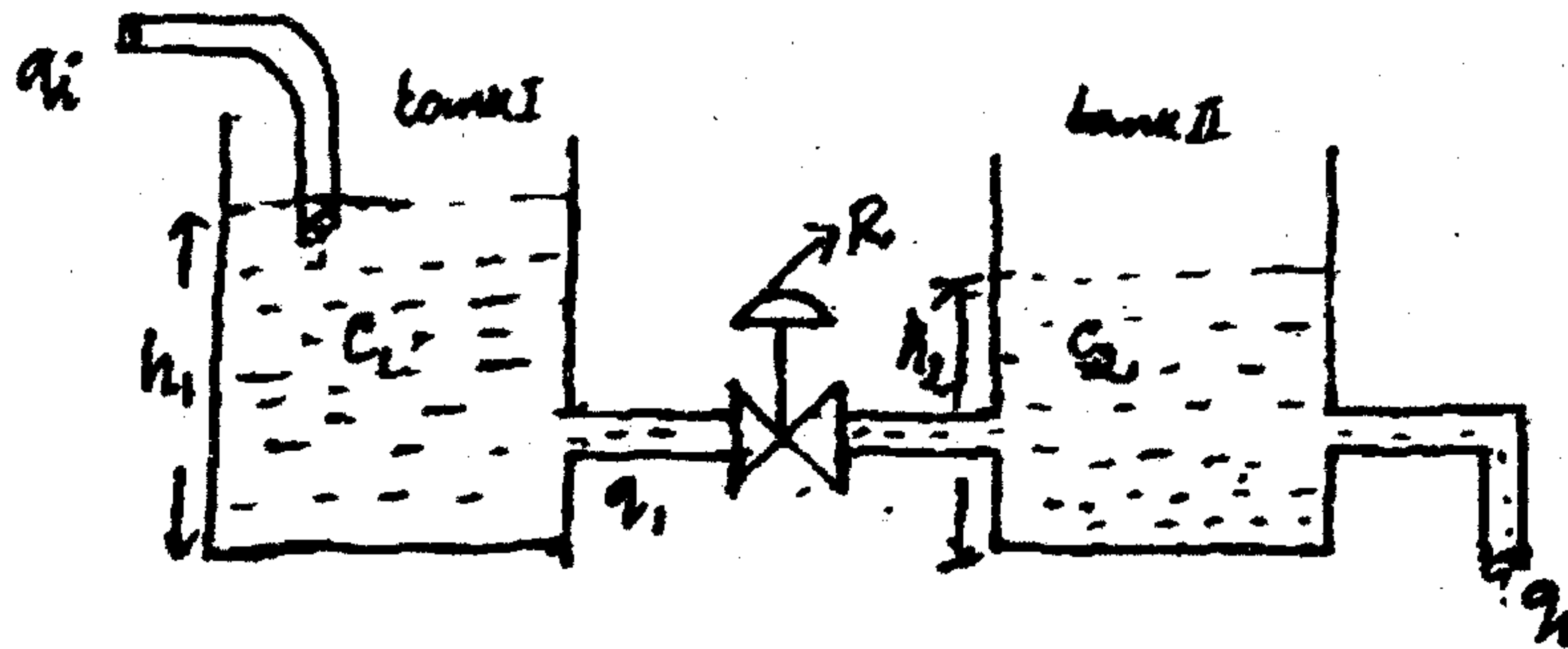
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between Batch process and continuous process.
2. What is Servo operation?
3. Define Neutral zone with respect to on-off controller.
4. What are the effects of PI controller?
5. Why the controllers need to be controlled?
6. List any two performance indices in process control.
7. What is meant by inferential control?
8. State the advantages of Feed-Forward control.
9. What is meant by cavitation?
10. What are the uses of control valve positioners?

PART B — (5 × 16 = 80 marks)

11. (a) Derive the mathematical model for the given process



C_1, C_2 – Capacitances of the tank I and II respectively.

h_1, h_2 and A_1, A_2 – Heights of liquid level and areas of the tanks tank I and II respectively

R – Resistance of the valve

q_i and q_1 – Inflow and outflow of tank I

q_o – Outflow of tank II

Or

- (b) (i) Distinguish between Servo and regulator operation. (6)
(ii) Explain the self-regulation process with an example. (10)
12. (a) (i) With neat schematic diagram, explain the single speed floating control. (6)
(ii) With neat sketch, explain the working of P+I pneumatic controller. (10)

Or

- (b) Explain, with a neat circuit diagram, the working of electronic PID controller. (16)
13. (a) Explain, how to find the controller settings using process reaction curve with an example. (16)

Or

- (b) Determine the optimum controller settings for the given transfer function $\frac{1}{(s+1)^3}$ using Ziegler-Nichols tuning method. (16)

14. (a) With suitable block diagram, explain the cascade control scheme and splitrange control scheme. (16)

Or

- (b) Explain the three element control scheme (multivariable control) in a boiler system. (16)
15. (a) (i) With neat circuit diagram, explain the I/P converter. (6)
- (ii) With necessary diagram, explain the characteristics of control valves. (10)

Or

- (b) Explain the procedure for control valve sizing for a flow control system. (16)