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Question Paper Code: 45504

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Electronics and Instrumentation Engineering

14UEI504 - PROCESS CONTROL INSTRUMENTATION

(Regulation 2014)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

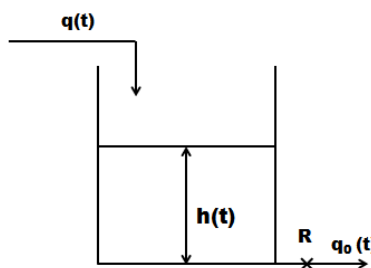
- The variable used to maintain the controlled variable at its set point is called
 - controlled variable
 - manipulated variable
 - set point variable
 - process variable
- Dead time is also called
 - pure delay
 - transport lag
 - distance-velocity lag
 - all of the above
- A controller is used to
 - reduce the error by generating a correction signal to the final control element
 - eliminate the disturbance by generating a correction signal to the final control element
 - both (a) and (b)
 - none of these
- The PI controller can be used in _____ control.
 - flow
 - temperature
 - liquid level
 - multi-capacity process
- To suppress errors that persist for long times, the _____ criterion will tune the controllers better.
 - ISE
 - IAE
 - ITAE
 - one quarter decay ratio

6. The _____ is reasonable trade off between fast rise time and reasonable setting time.
- (a) ISE (b) IAE (c) ITAE (d) one quarter decay ratio
7. In boiler drum, swell effect occurs due to
- (a) sudden load (steam demand) increase
 (b) sudden load (steam demand) decrease
 (c) feed water pressure variations
 (d) level variations
8. Three element control means
- (a) feedback (b) feedback + feedforward
 (c) cascade (d) feedforward+cascade
9. The objective of which of the following is to maintain the ratio of two process variables as a specified value.
- (a) feed forward control (b) cascade control
 (c) ratio control (d) inferential control
10. In which control loop, output of the controller is divided and sent to two or more control valves
- (a) inferential control (b) feed forward control
 (c) ratio control (d) split range control

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Develop the first order transfer function for a liquid level process shown below. Where, q , q_0 are inlet and outlet volumetric flow rates respectively. R – Resistance of the valve and pipe, h – head. (8)



12. The temperature range of a temperature controller is 250°C to 550°C . The set point is kept at 400°C . Solve the percent of span error when the temperature is 395°C , 400°C and 410°C and also calculate the measured value as percentage of measurement range. (8)
 13. What is the use of evaluation criteria? Explain IAE, ISE, ITAE and $\frac{1}{4}$ decay ratio criteria. (8)
 14. Explain the working of a simple current to pressure converter with neat diagram. (8)
 15. What is split range control? Explain with a simple example. (8)
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