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**Question Paper Code: 31554**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fifth Semester

Electronics and Instrumentation Engineering

01UEI504 – PROCESS CONTROL INSTRUMENTATION

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Why automatic process control is needed in industries?
2. Write about degree of freedom for a steam heater.
3. Where does the floating control mode is applied?
4. The standard measured indication range of transducer is 4-20mA. If we have a set point value of 11mA and a measurement of 11.5mA, calculate the error expressed as percentage of span.
5. Define one-quarter decay ratio.
6. What is controller tuning?
7. State the basic principle behind I/P converter.
8. Specify the purpose of valve positioner.
9. Why the Ziegler-Nichols tuning procedure is often called the continuous cyclic tuning method?
10. Under what circumstances inferential control is used?

PART - B (5 x 16 = 80 Marks)

11. (a) Derive the mathematical modeling of two tank interacting system. (16)

Or

- (b) Illustrate the concept of batch and continuous process with examples. Also specify the problems encountered and suggest the methods to overcome it. (16)

12. (a) Elucidate the discontinuous controller modes with examples. (16)

Or

- (b) Plot a graph of a PID controller output as a function of time for the error signal shown in below figure  $K_p=5$ ,  $K_I=0.7s^{-1}$ ,  $K_D=0.5s$  and  $PI(0)=20\%$ . (16)



13. (a) Describe the evaluation criteria of ISE , IAE and ITAE of the controller settings. (16)

Or

- (b) Discuss about the factors to be considered while selecting the type of controller for various processes. (16)

14. (a) Explain the inherent and installed characteristics of control valve with neat sketch. (16)

Or

- (b) Elucidate the problems encountered in cavitation with diagram and also discuss the methods to overcome the problems. (16)

15. (a) Discuss the process reaction curve method of tuning the controller with neat sketch. (16)

Or

- (b) Describe the concept of split range control for any two applications. (16)