Reg. No.	:	
----------	---	--

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 ($5 \times 16 = 80$ Marks)

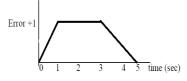
11. (a) Derive the mathematical modeling of two tank interacting system. (16)

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 Kp=5, KI= $0.7s^{-1}$, KD=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)