D 90281 (Pages 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2015

EE 09 705 L23—PROCESS CONTROL AND INSTRUMENTATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Why process control is necessary ?
2. Convert a 4-20 mA control signal to a 5-10 V signal.
3. What is the function of final control element ?
4. Give the PD control equation for composite control mode.
5. What is stability criteria ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain the process involved in identification of elements.
7. Give a brief note on digital electrical signals.
8. Explain the working of pneumatic actuators.
9. Explain cascade control with a block diagram and example.
10. What are the basic types of disturbance occur in a process control system ?
11. Explain feed forward control with an example from distillation column.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Explain the analog signal conditioning techniques used in process control.

Or

(b) Explain the system evaluation stability measures in process control.

13. (a) Explain the temperature transducers with neat sketch.

Or

(b) Explain the motor speed control process with neat sketch.

14. (a) A PI controller is reverse acting with PB = 20% and repeats per minute = 12 and derivative time 0.2 minute. Determine the time at which the controller output reaches zero percent if the input error ep to the controller varies ep = $0.9t$ % $t \geq 0$. The controller output at $t = 0$ was 72%.

Or

Turn over

(b) Explain the continuous control modes with neat sketch.

15. (a) In an application of the Ziegler-Nichols method, a process begins oscillation with a 30% proportional band in an 11.5 min. period. Find the nominal three controller settings.

Or

(b) Explain the cascade control system with suitable example.

(4 × 10 = 40 marks)