

Total number of printed pages-3

53 (IE 601) PRCN

2021

**PROCESS CONTROL**

Paper : IE 601

Full Marks : 100

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

Answer **any five** questions.

1. (a) Explain the terms (i) Resistance (ii) Capacitance for Liquid flows and Liquid storage tanks and Gas flow and Gas storage system. 10
- (b) State the Conservation Laws of Mass and Conservation of Energy. 10
2. (a) Explain the functional features, their detailed algorithms of Proportional and Integral control (PI) action. 5

Contd.

- (b) Explain the *three* characteristic features of PID control. 5
- (c) Discuss the various Hierarchy steps of Process Control. 10
3. (a) Explain the Tuning method of Ziegler and Nichols. 10
- (b) Explain self-regulation and integrating processes. 10
4. (a) Explain Feedforward control and its application to heat exchanger unit. 10
- (b) Explain the concept of cascade control and compare it with feedback control. 10
5. (a) Discuss the importance of Adaptive Control and *any one* configuration on Adaptive control. 10
- (b) Explain the phenomena of Inverse control in Boiler drum pressure control loop. 10

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6. (a) Explain the phenomena of reset windup in Integral controller. 10
- (b) Explain why a tank filled with liquid and connected by a pump at outlet of tank is not a controllable system. 10
7. (a) Define  $\rho_v$  of a valve. 5
- (b) Explain the phenomena of cavitation and flashing in a control valve. 10
- (c) Explain the various inherent characteristics of control valve. 5

