

22644

24225

3 Hours / 70 Marks

Seat No. 

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- Instructions* –
- (1) All Questions are *Compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. **Attempt any FIVE of the following** **10**
- a) Differentiate between single effect and multi-effect evaporator (2 point)
  - b) Draw the P and ID symbol for the following
    - i) Field mounted pressure transmitter
    - ii) Rotameter
  - c) Draw the inherent characteristics of control valve and label it.
  - d) Differentiate between feedback and feed forward control w.r.t any 2 points.
  - e) Draw the block diagram of cascade control system.
  - f) Describe any 4 safety interlocks of boiler
  - g) State the principle of distillation. State 4 equipment associated with it.

P.T.O.

- 2. Attempt any THREE of the following** **12**
- a) Differentiate between human aided and automatic control (any 4 points)
  - b) Define cavitation and flashing. describe any 2 remedies to avoid flashing
  - c) Draw the direct scheme of Ratio control system. Describe its working.
  - d) Draw the generic architecture of DCS. Describe its working
- 3. Attempt any THREE of the following.** **12**
- a) Differentiate between single seated and double seated control valve (any 4 points)
  - b) Draw the diagram of override control for protection of boiler. Describe its working
  - c) Draw the diagram of cascade control system for controlling the purity of distillate. Describe its working.
  - d) Draw any four types of DCS displays. Describe each in brief.
- 4. Attempt any THREE of the following** **12**
- a) Draw the block diagram of process control system. Describe each block.
  - b) Find the proper valve size in inches and centimeters for pumping the liquid flow rate of 600 gal/min with maximum pressure difference of 55 psi, liquid specific gravity is 1.3
  - c) Draw the block diagram of Adaptive control strategy for temperature control. Describe its working.
  - d) Draw the diagram of 3- element feed water control in boilers. Describe its operation
  - e) Differentiate between Modbus, and Profibus (any 4 points)

- 5. Attempt any TWO of the following** **12**
- a) State any two advantages of valves positioner. Draw the diagram of electro-pneumatic valve positioner and describe its working.
  - b) Describe the working of split range control with the help of an example.
  - c) Describe any four documents required for project engineering.
- 6. Attempt any TWO of the following.** **12**
- a) Describe the working type of autoneering type of selective control system for catalytic tubular reactors with highly exothermic reactions.
  - b) differentiate between co - current and counter current type of heat exchanger. Draw the Control scheme of feed forward control of heat exchanger and explain.
  - c) State the principle of adiabatic drying. Draw the diagram of feedback control scheme for fluidised bed dryer. Explain its working.
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