

# 17663

16117

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Illustrate your answers with neat sketch wherever necessary.  
(3) Figures to the right indicate full marks.  
(4) Assume suitable data, if necessary.  
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) Attempt any THREE of the following: 12
- (i) Compare human aided control system with automatic control system (Four points)
  - (ii) Explain the ratio control system with the help of suitable diagram.
  - (iii) List any four advantages of DCS system.
  - (iv) Explain the feed back control scheme for batch process.
- b) Attempt any ONE of the following: 6
- (i) What is instrument Index sheet? State its importance in project and prepare a sample instrument index sheet.
  - (ii) What is heat exchange? How are they classified? Explain any one heat exchanger in detail.

P.T.O.

- 2. Attempt any TWO of the following:** **16**
- a) Define cavitation and flashing. Explain the remedies to avoid cavitation and flashing in control valve.
  - b) Define evaporation. Explain the cascade control scheme for an evaporation with the help of neat diagram.
  - c) With the help of neat labelled block diagram explain the use of DCS in Thermal Power Plant.
- 3. Attempt any FOUR of the following:** **16**
- a) Draw and explain feedback control scheme in distillation column.
  - b) State the principle of control valve and explain its construction.
  - c) Compare feed forward control system with feedback control scheme (any four points)
  - d) Explain the construction and working of solenoid valve.
  - e) Explain the selection criteria for DCS system.
- 4. a) Attempt any THREE of the following:** **12**
- (i) Draw P and ID symbol for:
    - 1) Butterfly valve
    - 2) Boiler
    - 3) Electrical signal
    - 4) Pneumatic signal
  - (ii) Draw and explain flow characteristics of control valve.
  - (iii) Compare continuous process and batch process (four points)
  - (iv) State the role of instrumentation engineer in control project engineering.
- b) Attempt any ONE of the following:** **6**
- (i) State the need of valve positioner in control valve. List the types of valve positioners.
  - (ii) List the different communication methods in DCS. Explain any one of them in detail.

**5. Attempt any TWO of the following: 16**

- a) (i) Explain adaptive control scheme with the help of suitable diagram.
- (ii) Explain the selection criteria for a control valve.
- b) Draw P and ID for one element, two element and three element boiler control. Prepare the list of IO and instrument index sheet for the same.
- c) Draw the architecture of DCS. Explain the function of each block.

**6. Attempt any FOUR of the following: 16**

- a) List different process display. State the function of any two displays.
  - b) Explain the construction and working of butterfly valve.
  - c) What is drying? Explain the operation of drum dryer with the help of neat diagram.
  - d) Draw the block diagram of process control system and explain the role of each block.
  - e) Draw P and ID symbols for:
    - (i) Pressure transmitter
    - (ii) Ball valve
    - (iii) Orifice meter
    - (iv) Solenoid valve
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