

**INSTITUTE OF AERONAUTICAL ENGINEERING**

(Autonomous)

Dundigal-500043, Hyderabad

**B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022**

Regulation: R18

**INDUSTRIAL AUTOMATION AND CONTROL**

Time: 3 Hours

(EEE)

Max Marks: 70

Answer FIVE Questions choosing ONE question from each module  
(NOTE: Provision is given to answer TWO questions from any ONE module)

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

**MODULE – I**

1. (a) Draw the automation pyramid and explain each layer of automation pyramid. [7M]  
(b) Explain the construction and principle of operation of a Bourdon tube pressure gauge. [7M]
2. (a) What is accuracy and precision of a measuring instrument? Summarize the different types of errors in a measuring system. [7M]  
(b) Describe with neat sketch the construction, operation and characteristics of LVDT. [7M]

**MODULE – II**

3. (a) Explain the three methods for tuning of P, I and D parameters for a process. Analyze the effect of time delay on a process with an example. [7M]  
(b) Draw the block diagram of a feed forward-feedback control scheme and develop the transfer function. [7M]
4. (a) With suitable examples, list the difference between sequential control and continuous process control. [7M]  
(b) What is integration wind-up? Explain two methods for prevention of integration wind-up. [7M]

**MODULE – III**

5. (a) List the difference between a step of an SFC and a state of an FSM. Explain the major syntax conventions of the SFC programming language. [7M]  
(b) Design RLL diagrams for the forward and reverse control of an industrial motor. List merits and demerits of RLL programming. [7M]
6. (a) Classify the different modes of execution of a PLC program and list out some of the common components present in PLC hardware. [7M]  
(b) Identify the control inputs, outputs, sequence of events and actions in industrial stamping process. [7M]

**MODULE – IV**

7. (a) List the differences between point to point and contouring CNC systems. [7M]  
(b) Describe the principles of operation of hydraulic systems and list out its advantages. [7M].

8. (a) Describe the major types of direction control valves with their construction, operation and symbol. [7M]
- (b) What is the necessity of pressure switches? Explain about pressure switches used in hydraulic actuation system. [7M]

**MODULE – V**

9. (a) Discuss in detail open loop and closed loop control schemes used for step motors with schematic diagrams. [7M]
- (b) Describe the principle of operation of variable reluctance stepper motor with neat sketch. [7M]
10. (a) Derive the dynamic speed response characteristics relating armature voltage, load torque and speed. [7M]
- (b) Explain the operation of closed-loop induction motor drive with constant V/F control strategy. [7M]

