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Question Paper Code: AEE511



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

Four Year B.Tech V Semester End Examinations(Regular) - November, 2019

Regulation: IARE – R16

INDUSTRIAL AUTOMATION AND CONTROL

Time: 3 Hours

(EEE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

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

UNIT – I

- (a) Explain the construction and operating principle of thermo couple and list the materials used for design of thermo couple. [7M]

(b) Define the terms automation and control. Describe about automation pyramid and identify the layers. [7M]
- (a) Describe the operation of the speed measurement unit of the rotating body. [7M]

(b) Explain the construction and operation of Resistance Temperature Detector (RTD). [7M]

UNIT – II

- (a) Specify the guidelines for the selection of controller modes in a process control system. [7M]

(b) Define integration windup and describe two methods for prevention of integration windup. [7M]
- (a) Explain with an example, the principle of ratio control and why the controller used for ratio control is normally P-I type? [7M]

(b) Illustrate a Smith predictor scheme used for automatic gage control in rolling mill and explain. [7M]

UNIT – III

- (a) What is programmable logic controller (PLC) in automation? Explain the need of PLC in industrial automation. [7M]

(b) Define a PLC. Explain in detail about various PLC programming methods. [7M]
- (a) Write the typical operands of PLC program, and draw one simple relay ladder logic diagram. [7M]

(b) Draw the architecture of control software organized with sequential function charts, and explain in detail. [7M]

UNIT – IV

7. (a) Draw the block diagram, and explain the operation of the computer numerical control (CNC) machine in detail. [7M]
(b) List the advantages, disadvantages, and applications of the CNC machines [7M]
8. (a) Illustrate the importance of fluid delivery subsystem in hydraulic actuating system. [7M]
(b) Define a CNC machine. Define numerical control and describe its advantages and disadvantages. [7M]

UNIT – V

9. (a) Explain in detail about the energy savings by two different flow control methods. [7M]
(b) Describe the working principle of two-phase, two-pole permanent magnet stepper motor along with switching sequence. [7M]
10. (a) Explain the operation of closed-loop induction motor drive with constant volts/Hz control strategy. [7M]
(b) Perform closed loop control of induction motor drive using constant V/f control strategy. [7M]