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524202

May 2024

M.Tech. (Manufacturing and Automation Technology)

IInd Semester

Automation in Manufacturing (MMTA-202)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Compare sequence logic and combinational logic. CO2 (1.5)

(b) Write three advantages of automation in manufacturing. CO1 (1.5)

(c) Sketch a liquid level sensor. CO3 (1.5)

(d) How do you select a sensor for a particular application? CO3 (1.5)

(e) Define automation. CO1 (1.5)

(f) What is AS/RS in material transport system? CO5 (1.5)

(g) How do you provide vibrations in automatic feeder? CO5 (1.5)

(h) Draw mathematical model of a car. CO4 (1.5)

(i) What do you mean by controller tuning? CO6 (1.5)

(j) Compare open loop and close loop control. CO6 (1.5)

PART–B

2. (a) Describe various strategies of automation. CO1 (10)

(b) Explain basic elements of automation system. CO1 (5)

3. (a) Explain the application of the microcontroller in automation. CO2 (5)

(b) Describe truth table of AND, OR, NAND, NOR and J K flip-flop. CO2 (10)

4. What is Kp, Ki and Kd? How do you find Kp, Ki and Kd using process reaction method and ultimate cycle method of contoller tuning. CO6 (15)

5. (a) Explain the method of measuring pressure using stain guage. CO3 (5)

(b) Describe hydraulic actuator with a neat sketch. Compare it with pneumatic actuator. CO3 (10)

6. (a) Sketch centrifugal feeder for automatic feeding of parts. CO5 (5)

(b) Calculate feed rate (parts/hour) of a rotary disc feeder and design it with the following data :

Efficiency of the feeder : 90%

Length of slot : 0.1 m

Length of part : 0.05 m

Angle of inclination of delivery chute : 30°

Coefficient of friction between part and chute : 0.2. CO5 (10)

7. Describe the method of analogue to digital conversion. Drive expression of I order differential equation for rotational-translation system. CO4 (15)