CBCS SCHEME

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18ME732

Seventh Semester B.E. Degree Examination, July/August 2022
Automation and Robotics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is Automation? Explain the basic elements of an automated system. **(06 Marks)**

b. What is the difference between a closed loop control system and an open loop control system? **(06 Marks)**

c. Briefly explain the advanced automation functions. **(03 Marks)**

d. Briefly explain five levels of automation. **(05 Marks)**

OR

2 a. What is the difference between a continuous control system and a discrete control system? **(06 Marks)**

b. What is Sensors? Explain analog and discrete measuring device. **(06 Marks)**

c. Explain with block diagram analog to digital converters. **(08 Marks)**

Module-2

3 a. With sketch explain the types of flow line configurations. **(12 Marks)**

b. Write a short note on buffer storage. **(05 Marks)**

c. Explain the three control functions of the automate production line. **(03 Marks)**

OR

4 a. A ten station transfer machine has an ideal cycle time of 30 sec. The frequency of line stops is F = 0.075 stops/cycle. When a line stop occurs, the average down time is 4.0min. The cost of raw work part is Rs.0.55/pc, line operating cost is Rs.42.00/hr and cost of disposable tooling is Rs.0.27/pc. Determine:

i) Average production rate in pc/hr.
ii) Line efficiency
iii) Proportion down time
iv) The average cost of work piece produced. **(09 Marks)**

b. Write a short note on automatic identification methods. **(06 Marks)**

c. Explain in briefly magnetic stripes, optical character recognition and machine vision. **(05 Marks)**

Module-3

5 a. What is Industrial Robotics? Explain with neat sketch Robotic configuration. **(10 Marks)**

b. Explain with sketch six degrees of freedom in Robotics. **(10 Marks)**

OR

6 a. What are the Industrial Robot applications? **(08 Marks)**

b. What is End effectors? Briefly explain the type of End-Effectors. **(06 Marks)**

c. Explain with sketch Robot Accuracy and Repeatability. **(06 Marks)**

Module-4

7 a. Explain with sketch hydraulic system for Robot. (08 Marks)
b. What are the characteristics of pneumatic actuators used in Robotics? (06 Marks)
c. Write a short note on servo motor and stepper motor. (06 Marks)

OR

8 a. What is Homogeneous Transformation? Explain. (08 Marks)
b. Explain for the Denavit Hartenberg (D-H) representation of robot. (12 Marks)

Module-5

9 a. Explain in levels of Robot programming. (09 Marks)
b. What are the requirements of a robot programming language? (05 Marks)
c. What are problems pertaining to robot programming languages? (06 Marks)

OR

10 a. Explain off-line programming systems. (08 Marks)
b. Explain in central issues in OLP systems. (12 Marks)

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