CBCS SCHEME

USN | | | | | | | | | | |

18MA651

Sixth 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. Briefly explain the different types of Automation. **(10 Marks)**

b. Write short notes : i) Reasons for Automation ii) Disadvantages of Automation. **(10 Marks)**

OR

2 a. Define FMS. List out the Benefits and applications of FMS. **(10 Marks)**

b. Explain the different types of FMS. **(10 Marks)**

Module-2

3 a. Define Robot. Discuss robot anatomy and state Asimov's Law for Robotics. **(10 Marks)**

b. Explain common robot configurations with a neat diagram. **(10 Marks)**

OR

4 a. Explain the following with respect to robot :
i) Accuracy ii) Spatial resolution iii) Repeatability. **(06 Marks)**

b. Explain the interpretation used to map points between frames as operators using translation and rotation. **(08 Marks)**

c. Describe positions and orientation as related to manipulator. **(06 Marks)**

Module-3

5 a. Write the characteristics equation for a spring Mass Damper system and based on the damping classify the four types of system. **(10 Marks)**

b. What is control system? Briefly explain the PI and PID controllers with transfer functions. **(10 Marks)**

OR

6 a. Explain the following position sensors : i) Potentiometer ii) Encoders. **(10 Marks)**

b. With a schematic diagram, explain stepper motor helps to move the robotic arm. **(10 Marks)**

Module-4

7 a. What are tactile sensors? Explain any two types of tactile sensors. **(10 Marks)**

b. Explain proximity and range sensors. **(10 Marks)**

OR

8 a. Explain sensing and digitizing image data related to machine vision system. **(10 Marks)**

b. Explain the various segmentation techniques used in image processing. **(10 Marks)**

Module-5

9 Write short notes on the following :

a. Robot intelligence

b. Mechanical design features

c. Mobility, locomotion and navigation

d. Advanced sensor capabilities. **(20 Marks)**

OR

10 a. Briefly discuss the goals of AI research. **(10 Marks)**

b. Explain the different levels of robot programming. **(10 Marks)**

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