

CBCS SCHEME

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15ME563

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019

Automation and Robotics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Briefly explain the different types of automation. (08 Marks)
b. Write short notes on: i) Reasons for automation ii) Disadvantages of Automation. (08 Marks)

OR

- 2 a. Define FMS and list out the benefits of FMS. (06 Marks)
b. Briefly explain the various components of FMS. (10 Marks)

Module-2

- 3 a. Define a Robot and state Asimov's laws for robotics. (04 Marks)
b. Discuss robot anatomy and sketch the following robot configuration:
i) Polar configuration ii) Jointed arm configuration. (12 Marks)

OR

- 4 a. With respect to precision of movement, define the following terms:
i) Spatial resolution ii) Accuracy iii) Repeatability. (06 Marks)
b. Briefly explain the different types of joints used in robots. (10 Marks)

Module-3

- 5 Derive a mathematical model for a spring-mass damper system and draw the block diagram for the same. Also reduce it to a single block using block diagram algebra. (16 Marks)

OR

- 6 a. Write short notes on resolvers and encoders. (10 Marks)
b. At time t , the excitation voltage to a resolver is $24V$. The shaft angle is 90° . What is the output signal from resolver? Also if $V_{s_1} = 17V$ and $V_{s_2} = -17V$, calculate the angle. (06 Marks)

Module-4

- 7 a. Briefly discuss about the tactile sensors used in robotics. (12 Marks)
b. List out the application of sensors in robotics. (04 Marks)

OR

- 8 a. Explain various illumination techniques used in machine vision. (06 Marks)
b. Discuss the various segmentation techniques used in Image Processing. (10 Marks)

Module-5

- 9 a. Discuss the necessary parameters that can be used to assess the performance of a future robot. (10 Marks)
b. Write short note on Telepresence. (06 Marks)

OR

- 10 a. Briefly discuss the goals of AI research. (10 Marks)
b. List out the various search techniques in problem solving. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.