

# CBCS SCHEME

15ME563

## Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 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. List the reasons used to undertake projects in manufacturing automation and computer – integrated manufacturing. (06 Marks)
- b. What is FMS? Discuss in detail the components of an FMS. (10 Marks)

OR

- 2 a. Compare the salient features of automation types. (06 Marks)
- b. Discuss the benefits of an FMS in brief. (04 Marks)
- c. List the capabilities that make a manufacturing system flexible and tests of flexibility in an automated manufacturing system. (06 Marks)

### Module-2

- 3 a. Briefly explain the manipulator joints of robot with respect to input and output link. (10 Marks)
- b. Explain with neat sketch, indicating degrees of freedom, wrist assembly of robot. (06 Marks)

OR

- 4 a. Explain with neat sketches, indicating joint notation scheme for  
i) Cylindrical and ii) Jointed – arm configuration of a robot. (08 Marks)
- b. Explain the following terms with sketches :  
i) Spatial resolution ii) Accuracy iii) Repeatability. (08 Marks)

### Module-3

- 5 a. For the Spring – mass – damper system shown in fig.Q5(a), derive the transfer function.

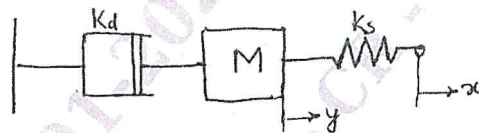


Fig.Q5(a)

- b. Briefly explain the use of encoders for position measurement in robotics. (08 Marks)

OR

- 6 a. Explain with sketches, the response curves in a second order linear system. (10 Marks)
- b. Explain with sketch, how a stepper motors is used in robots. (06 Marks)

### Module-4

- 7 a. Briefly explain the types of tactile sensors in robotics. (08 Marks)
- b. With block diagram representation, explain the functions of a machine vision system. (08 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.

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OR

- 8 a. Explain the major uses of sensor in industrial robotics and other automated manufacturing systems. (04 Marks)
- b. Explain in brief, the steps involved in image processing and analysis as applied to robotic vision. (12 Marks)

**Module-5**

- 9 a. List the characteristic features and capabilities of the future robot. (08 Marks)
- b. Discuss any two AI techniques for representing knowledge. (08 Marks)

OR

- 10 a. Explain telepresence and related technologies in the field of robotics. (08 Marks)
- b. Discuss any three search techniques in problem solving. (08 Marks)

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