

# CBCS SCHEME

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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. (08 Marks)

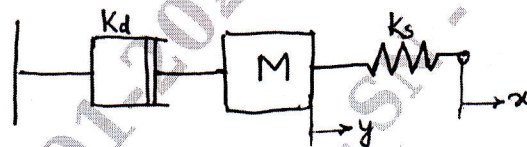


Fig.Q5(a)

- 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)

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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