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7E7017

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B.Tech. VII - Semester (Main and Back) Examination, Nov. - 2019

Mechanical Engg.

7ME6.2A Robotics

(Common for ME, PE)

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT - I

1. Describe evolution of robots and robotics. How are robots different from conventional machine tools in terms of design and control? (16)

(OR)

1. Explain the mechanical structure of a manipulator using neat sketches. Briefly describe the four basic configurations of arm in manipulators. (16)

UNIT - II

2. Classify the end - effectors. Differentiate between various grippers on the basis of design and drive system. (16)

(OR)

2. The coordinates of point k in frame {1} are $[3.0 \ 2.0 \ 1.0]^T$. The position vector k is rotated about z - axis by 45° . Find the coordinates of point L, the new position of point K. (16)

UNIT - III

3. Explain the kinematic modeling of a manipulator. Describe various inputs and outputs considered in the modeling. (16)

(OR)

3. Explain in detail the two approaches to the solutions to the inverse kinematic model. (16)

UNIT - IV

4. What are the various sensors used in robotics? Describe the criteria of selecting sensor for different application. (16)

(OR)

4. Describe the architecture of Robotic vision system. Write about its industrial applications. (16)

UNIT - V

5. Write about assembly and inspection applications of robots. (16)

(OR)

5. Classify the robot languages. Highlight the importance of computer control and robot software. (16)

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