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Question Paper Code : 60830

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Mechanical Engineering

ME 2028/ME 702/IC 1404/080120060/10177 MEE 22/10122 MEE 22 — ROBOTICS/
INDUSTRIAL ROBOTICS

(Common to Production Engineering and Automobile Engineering)

(Also common to PTME 2028 — Robotics for B.E. (Part-Time) – Seventh Semester –
Mechanical Engineering – Regulations 2009)

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define base and tool coordinate systems.
2. Name the important specifications of an industrial robot.
3. How is a stepper motor different from a conventional motor?
4. List any four types of mechanical gripper.
5. What is the function of a piezoelectric sensor.
6. What is image analysis?
7. Define a manipulator.
8. List any two applications of straight line interpolation in robotics.
9. What are the applications of RGV?
10. What is the need for robots?

PART B — (5 × 16 = 80 marks)

11. (a) With suitable sketch, explain the four types of robots classified according to the coordinate of motion. (16)

Or

- (b) (i) Sketch a robot wrist and explain the degrees of freedom associated with it. (12)
(ii) Write briefly about robot joint notations. (4)

12. (a) Discuss about the salient features of different drive systems used in robots. (16)

Or

- (b) Explain the types of end effector and gripper mechanisms with simple sketches. (16)

13. (a) Describe any one algorithm for image edge detection and image segmentation with its advantages. (16)

Or

- (b) Describe the principle and application of LVDT, Resolver and Range sensor. (16)

14. (a) Explain the functions of an inverse kinematics algorithm.

Or

- (b) List the commands used in VAL programming and describe its functions.

15. (a) (i) Explain the procedure of applying any one method in the economic analysis of robots. (8)

- (ii) Explain obstacle detection and avoidance in AGVs. (8)

Or

- (b) Explain the factors to be considered for industrial applications of robot. (16)