MEM 63 - Robotics

**215**

REG. NO

**OCTOBER 2021**

Time: Three hours Maximum Marks: 75

Note:
1. Answer ALL the questions in PART-A (1 mark each)
2. Answer any ONE question from each unit in PART-B (3 marks each)
3. Answer any ONE question from each unit in PART-C (10 marks each)
4. The question paper contains TWO Pages

**PART-A** (1x10=10)

1. List the various components of Robot.
2. What is Degree of Freedom?
3. Define accuracy of a Robot.
4. Name the various types of Grippers used in Robot.
5. Name a few Sensor devices used in Robot Work Cell.
6. Why is Data Reduction needed in Digital Image Processing?
7. What is Forward Kinematics?
8. What are Sensor Commands?
9. List a few applications of Industrial Robot.
10. What is an AGV?

**PART-B** (3x5=15)

UNIT-I

11. Explain the various types of joints used in Robot.
12. Demonstrate Pitch & Yaw motion in Robot arm.

UNIT-II

13. Compare Open Loop control with Closed Loop Control.
14. Compare AC servo drive with DC servo drive.

UNIT-III

15. Explain the working of LVDT.
16. What are the various lighting techniques used in Image Processing?

UNIT-IV

17. Compare Lead through programming with Teach pendant programming.
18. What are the various Motion command used in Robot program?

UNIT-V

19. Write short notes on Robot Arc welding.
20. Explain Machine Tool Loading & Unloading in Automated Work Cell.

## PART-C (10x5=50)

UNIT-I

21. How are the Robots classified? Explain with neat sketch the various degree of freedom of a Jointed arm configuration Robot.
22. What is work volume? Explain with neat sketch how the work volume is related to the Robot configuration.

UNIT-II

23. How are the Grippers classified? Explain with neat sketch the working of Vacuum Gripper.
24. Explain in detail the selection and design consideration of End of Arm Tooling.

UNIT-III

25. What are the various types of Proximity Sensors? Explain with neat sketch the working of Capacitive type Proximity Sensor.
26. What are the various stages in Digital Image Processing (DIP)? Explain Edge detection technique used in DIP.

UNIT-IV

27. Derive the expression for Forward and Inverse Kinematics for Robot with 2 Degrees of freedom.
28. What are the various types of commands used in Robot Programming? Explain the sensor commands used in Robot Programming.

UNIT-V

29. Explain the application of Robot for Spray Painting.
30. Explain the stages in selecting an Robot for Industrial Application.

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