

22587

23124

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Answer each next main Question on a new page.
- (3) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (5) Assume suitable data, if necessary.
- (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following :** **10**
- Define Robot and state two uses.
 - List the different joints used in robots.
 - List various generations of Robot programming languages.
 - List various future applications of robots.
 - Define path and trajectory of a robot.
 - Draw linear joint and orthogonal joint.
 - State various image devices used in robot lightning techniques.

P.T.O.

- 2. Attempt any THREE of the following :** **12**
- a) State various capabilities and limitations of lead through programming method.
 - b) Explain the necessary safety precautions for robot handling.
 - c) Explain continuous arc welding with diagram.
 - d) Define -
 - i) DOF
 - ii) Repeatability
 - iii) Accuracy
 - iv) Resolution in robotics.
- 3. Attempt any THREE of the following :** **12**
- a) State different law of robotics.
 - b) State the need of telepresence and related technologies.
 - c) Write the features of VAL programming.
 - d) Explain the concept universal hand.
 - e) Explain Vacuum Grippers along with their advantages and disadvantages.
- 4. Attempt any THREE of the following :** **12**
- a) Explain Grippers. List any four grippers.
 - b) Explain Teach pendant in brief.
 - c) Explain working of piezoelectric sensor with diagram.
 - d) Explain various methods available for image segmentation based on colour.
 - e) Explain the procedure to test and troubleshoot robots.

- 5. Attempt any TWO of the following :** **12**
- a) Define work envelope ? Draw and explain work envelope for Cartesian coordinate.
 - b) Explain any four types of robot programming. Discuss the important requirements of programming languages.
 - c) List any 6 VAL commands with functions used in programming.
- 6. Attempt any TWO of the following :** **12**
- a) Briefly explain the working principle of any two types of position sensors with neat sketch.
 - b) Write a robot program to perform pick and place operation on the converter system, it consists of two conveyors running parallel with center distance of 600 mm at the same level. An industrial robot is fixed centrally between the conveyors. The robot is used to transfer work pieces from conveyor 1 to 3 at a constant speed, assuming all necessary dimensions.
 - c) Explain robot vision system and list the applications of robot vision controlled robotic system.
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