

Total number of printed pages-3

53 (CS 812) RBTC

2019

ROBOTICS

Paper : CS 812

Full Marks : 100

Time : Three hours

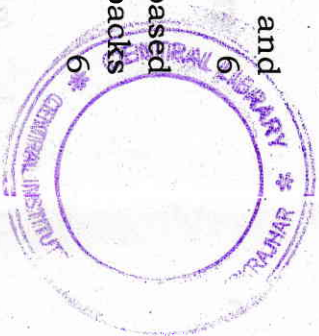
The figures in the margin indicate full marks for the questions.

Answer **any five** questions.

1. (a) What is a Robot and mention its suitable tasks? 6
- (b) What kind of tasks are done by using Robotics? 6
- (c) Describe the Humanoid robot with capabilities. 8

Contd.

2. (a) What types of challenges are found in Autonomous robotics ? 5
- (b) What is sensor suite ? 3
- (c) How to design this sensor suite with their attributes ? 12
3. (a) Explain the four robot control systems and draw a hierarchical diagram for traditional robot control system. 8
- (b) Explain the Motion, Interlock and Sensor Commands. 6
- (c) Explain open and closed loop-based Industrial robot with their drawbacks also. 6
4. (a) Draw a diagram of 2-DOF. 6
- (b) Derive the reverse transformation (d_1 & d_2) using the 2-DOF. Given links values are L_1 & L_2 . 14
5. (a) What is an image digitization ? 3



- (b) Explain the quantization and sampling role in image digitization. 10
- (c) Explain the dilation and erosion operators in morphological operations. 7
6. Write short notes on : (**any four**) 5x4=20
- (a) Metric and topological properties
- (b) Task-level programming
- (c) Kinematics
- (d) ENTROPY
- (e) Sensor fusion
- (f) Robot Manipulator.