Reg. No. :

Question Paper Code : 90557

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Fifth Semester
Robotics and Automation Engineering
RO 8591 – PRINCIPLES OF ROBOTICS
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Mention few applications of robots.
2. Brief about position sensors and where it is used ?
3. State the SCARA Robots.
4. Give different types of robot drive systems.
5. What is the importance of Gripper and its uses.
6. List out different robot programming methods.
7. What are the geometric constraints ?
8. Define Joint space Trajectory.
9. State Lagrangian formulation.
10. State Newton-Euler formulation.

PART – B (5×13=65 Marks)

11. a) Define Industrial robotics and explain detail automation in robotics. (13)

(OR)

b) Explain about classification based on
i) Configuration. (7)
ii) Controls. (6)

12. a) Discuss in detail homogeneous transformation matrix.

(OR)

b) Explain about forward and reverse kinematics of manipulator with 2 degree of freedom in 2 dimensional with neat sketches. **(13)**

13. a) Derive the Jacobian matrix for the 2-link planar manipulator.

(OR)

b) Explain about robot parts and its functions with applications.

14. a) Explain about position and orientation of a robotic system and also find centroid of an object.

(OR)

b) Discuss in detail the cubic polynomial.

15. a) Derive the Euler-Lagrange Equation for One-Dimensional system. Explain with an example. **(13)**

(OR)

b) Derive an equation of force control system in robot. **(13)**

PART – C **(1×15=15 Marks)**

16. a) What are the general characteristics of Automatic Guided Vehicle and also explain different types of robots presently in usage ? **(15)**

(OR)

b) Design a robot to transfer material from one place to another place, with example. **(15)**

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