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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21484

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Sixth Semester

Electrical and Electronics Engineering

EE 2023/EE 603/10133 EEE 14 — ROBOTICS AND AUTOMATION

(Common to Eighth Semester Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State three laws of robotics.
2. Explain the term repeatability and accuracy in robot.
3. Differentiate between external and internal sensor.
4. Compare the pros and cons of pneumatic and hydraulic actuators.
5. What are the applications of parallel manipulator?
6. List few design considerations for grippers.
7. What is the significance of homogenous transformation?
8. What are the advantages and disadvantages of off-line programming?
9. What are the benefits of Robot spray painting?
10. List any four non-manufacturing applications of robot.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe with neat sketches various types of joints used in Robots. (8)

(ii) Enumerate with neat sketches common robot configurations. (8)

Or

(b) Discuss salient features of various generations of robots. (16)

12. (a) Write short notes :

(i) Fiber optic sensor (5)

(ii) Tactile sensor (5)

(iii) Micro machines in robotics (6)

Or

(b) (i) Discuss various steps involved in machine vision. (10)

(ii) Explain with neat sketch the working principle of servo motor. (6)

13. (a) What is an actuator? What are the different types of actuators used for robots? Explain the working of a hydraulic actuator system. (16)

Or

(b) Describe with sketches the construction and working principle of various mechanical grippers. (16)

14. (a) (i) What is a Jacobian work envelope? Explain. (8)

(ii) What are the advantages and disadvantages of off-line programming? (8)

Or

(b) With neat sketch Illustrate and derive Forward and Inverse Kinematics mechanism for 2 Dimensional 3 Joint Robot. (16)

15. (a) What is robot cell? Discuss the popular robotic cell layouts. Explain its design considerations. (16)

Or

(b) Write short notes :

(i) Application of robot in hazardous environment (8)

(ii) Selection of a robot. (8)