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Question Paper Code : 40425

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fifth Semester

Electronics and Communication engineering

EC 8074 — ROBOTICS AND AUTOMATION

(Regulations 2017)

(Common to Medical Electronics)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List any four advantages of using robot in material handling applications
2. Define robot anatomy.
3. Why the servomotors are most preferred actuator for robot manipulators?
4. What are the advantages of hydraulic drive over pneumatic drives?
5. Differentiate between forward and inverse kinematics.
6. List out any two drawbacks in vacuum gripper.
7. Why is SLAM a hard problem?
8. What is fuzzy logic?
9. What is mean by virtual reality?
10. List any two robots that are using artificial intelligence.

PART B — (5 × 13 = 65 marks)

11. (a) How are the robotic manipulators classified? Give the comparison of robots on the basis of coordinate systems.

Or

- (b) Write a short note on the following features of a robot

- (i) Spatial resolution
- (ii) Accuracy
- (iii) Repeatability
- (iv) Degrees of freedom.

12. (a) With a neat circuit diagram, explain how the speed and direction of a DC motor can be controlled.

Or

- (b) Discuss in detail about the use of sensors in industrial robotics and automated manufacturing systems.

13. (a) Using DH method and by symbolic sketch, write down the transformation matrices for each link and determine the position and orientation of end effector with respect to the base in a cartesian robot configuration.

Or

- (b) Write the factors to be considered for the selection of gripper for specific application and also explain anyone gripper with a neat sketch.

14. (a) Discuss about robot programming languages and also explain teach-pendant for robotic system.

Or

- (b) Discuss in detail about cartesian control for robot manipulators.

15. (a) AI and machine learning can improve robotics — Justify.

Or

- (b) Write the different types of unmanned vehicles and explain any one in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss in detail about tele-operated robotic surgery and cognitive robotics.

Or

- (b) Explain the selection procedure of a robot for arc welding application. Also explain the necessary precautions that must be addressed while using this robot in a shop-floor along with other automated machines.
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