Reg. No. :

Question Paper Code:49508

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

Elective

Electronics and Instrumentation Engineering

14UEI908- ROBOTICS AND AUTOMATION

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following terms refers to the rotational motion of a robot arm?   CO1- R

    (a) swivel   (b) axle   (c) retrograde   (d) roll

2. Maximum number of variable required to define the motion of body in space.   CO1- R

    (a) 4   (b) 6   (c) 2   (d) 1

3. The number of moveable joints in the base, the arm, and the end effectors of the robot determines_____   CO2- R

    (a) degrees of freedom   (b) payload capacity

    (c) operational limits   (d) flexibility

4. Frame grabber is used to   CO2- R

    (a) Archive the image   (b) Segment the image

    (c) Process the image   (d) Capture and store digital image

5. The original LISP machines produced by both LMI and Symbolics were based on research performed at: CO3- R

    (a) CMU   (b) MIT   (c) Stanford University   (d) RAMD

6. Magnetic type gripper need _____   CO3- R

    (a) smooth surface to hold   (b) surface without any hold

    (c) one side of surface to hold   (d) corner less surface to hold

7. In LISP, the function returns t if   CO4- R

   (a) (cons <object>)   (b)(consp <object>)

   (c) (eq <object>)   (d)(cous= object>)

8. The 2-DOF universal joint is the combination of intersecting of   CO4- R

   (a) Two revolute joints   (b) Two prismatic joints

   (c) Two Helical joints   (d) Two planner joints

9. Given a sound clip of a person or people speaking, determine the   CO5- R
   textual representation of the speech.

   (a) Text-to-speech   (b) Speech-to-text

   (c) All of the mentioned   (d) None of the mentioned

10. A PUMA robot usually consists of   CO5- R

   (a) Six revolute axes   (b) Five revolute axes

   (c) Four revolute axes   (d) Three revolute axes

PART – B (5 x 2= 10Marks)

11. Name the integral parts of a robot   CO1-R

12. What are the advantages of using tactile array sensors in a robot?   CO2-R

13. Give the basic types of robot programming languages   CO3- R

14. State the robot language elements.   CO4- R

15. Describe the various layouts of robot cell.   CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Classify the robots based on degrees of freedom and drive   CO1- App (16)
       technology.

                         Or

   (b) Categorize the robot by configuration and control with neat CO1- App (16)
       sketch.

17. (a) Differentiate and non'tactile sensors. Sketch and explain the CO2- App (16)
       Working of an acoustic sensor.

                         Or

   (b) Explain the processing analysis of an image by robot vision CO2- U (16)
       techniques.

18. (a) Discuss the different types of stepper motors used in robot CO3- Ana (16)
       manipulators. Enumerate the differences between hydraulic
       drives and Pneumatic drives

                         Or

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(b) Classify and explain the robot end-effectors from the view point of control. Discuss the design considerations in the robot end-of-the-arm tooling.   CO3- Ana   (16)

19. (a) Develop a direct and inverse kinematic equation for a spherical robot configuration   CO4- U   (16)

Or

(b) Classify various methods of robot programming. Justify A Robot program as a path in space with the help of interpolation scheme   CO4- Ana   (16)

20. (a) With suitable diagram, explain industrial application of robot in non-manufacturing field   CO5- U   (16)

Or

(b) Discuss in detail Typical EGS of automated Industries   CO5- U   (16)

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