A

Reg. No. :

Question Paper Code: 59375

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Open elective

Civil Engineering

15UEE975 -PRINCIPLES OF ROBOTICS

(Common to CSE, ECE, MECH, EIE , IT and Chemical Engineering)

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The Robot designed with Cartesian coordinate systems has   CO1- R

    (a) Three linear movements

    (b) Three rotational movements

    (c) Two linear and one rotational movement

    (d) Two rotational and one linear movement

2. Robot is derived from Czech word _____.   CO1- R

    (a) Rabota   (b)Robota   (c) Rebota   (d) Ribota

3. The Horsepower of motor which has RPM and Torque is 3000 & 6 in-lbf   CO2- R
    respectively is_____

     (a) 0.286   (b) 1.2   (c) 2800   (d) none of these

4.   In Fleming's left-hand rule the thumb points towards the direction of   CO2- R

    (a) Force   (b) Current   (c) Magnetic field   (d) Both a & b

5.   Lead through methods referred to as _____ method.   CO3- R

    (a) Tech by showing   (b) Learning   (c) Compliance   (d) Artificial intelligence

6. For a robot unit to be considered a functional industrial robot, typically, CO3- R
    how many degrees of freedom would the robot have?

    (a) three   (b) four   (c) six   (d) eight

7. _____ Kinematics will enable to determine where the Robot's hand will be if all joint variable are known.   CO4- R

   (a) Forward   (b) Reverse   (c) Inverse   (d) Transformation

8. A sensor used in path determination robot   CO4- R

   (a) ultrasonic sensor   (b) IR sensor   (c) proximity sensor Bits   (d) echo sensor

9. Which of the following places would be LEAST likely to include operational robots?   CO5- R

   (a) Warehouse   (b) Factory   (c) Hospitals   (d) Private homes

10. Automation with little human touch is known as   CO5- R

   (a) Automation   (b) Autonomation   (c) Semi worker   (d) Manual work

<center>PART – B (5 x 2= 10 Marks)</center>

11. Define Robotics.   CO1- U

12. Analyze the difference between electronic and pneumatic manipulators.   CO2- Ana

13. What is application of machine vision system?   CO3- U

14. Distinguish Kinematics and Dynamics.   CO4- U

15. Explain about path planning?   CO5- U

<center>PART – C (5 x 16= 80 Marks)</center>

16. (a)   Briefly describe the Robotic Systems with a neat sketch.   CO1- U   (16)

<center>Or</center>

   (b)   Explain in details about the Degree of freedom with a neat sketch. CO1- U   (16)

17. (a)   Compare hydraulic, pneumatic and electrical drives. Sketch and explain pneumatic actuators.   CO2-U   (16)

<center>Or</center>

   (b)   Explain in details about DC PMMC motor and Brushless DC motor with a neat sketch   CO2-U   (16)

18. (a)   Explain about the different stages of machine vision system and its types of illumination systems.   CO3-U   (16)

<center>Or</center>

   (b)   Discuss in detail about Proximity sensors and Touch sensors.   CO3-U   (16)

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19. (a) Illustrate in detail the forward and inverse problem of CO4- U (16) manipulator kinematics in robots.

Or

(b) Explain about Jacobian in terms of D-H matrices in Robot CO4- U (16) Kinematics.

20. (a) Discuss in details about Block Diagram of Robot control System CO5- U (16) & motion control.

Or

(b) Explain in details about Force Control with a neat sketch. CO5- U (16)

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