A Reg. No. :

Question Paper Code: 99703

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Elective

Mechanical Engineering

19UME925– INDUSTRIAL ROBOTICS

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A Robot is a _____.   CO1-U

    (a) Programmable   (b) Multi-functional Manipulator

    (c) Both (a) and (b)   (d) None of the above

2. Polar configuration robot notation   CO1-U

    (a) TRL   (b) TTL   (c) TRR   (d) TRT

3. Grippers are used to _____   CO1-U

    (a) Hold the objects (b) Sense the objects (c) Move the objects (d) Both a & c

4. Which of the following is type of gripper used in robotics?   CO1-U

    (a) Magnetic   (b) Adhesive

    (c) Mechanical   (d) All the above

5. The sensor converts light rays into an electrical signal _____   CO1-U

    (a) Optical sensor   (b) Encoder

    (c) Potentiometer   (d) Capacitive sensor

6. Example of sensor used for position sensing   CO1-U

    (a) Sonar system   (b)Radar system   (c) Proximity sensor   (d) All the above

7. Which of the following is not a programming language for computer contr   CO1-U
    robot?

    (a) AMU   (b) VAL   (c) RAIL   (d) HELP

8. Degree of freedom of robot kinematics   CO1-U

(a) 3(n-1)-2l-h   (b) 3(n-1)+2l+h   (c) 3(n+1)-2l-2h   (d)3(n-1)-2l-2h

9. A portable robot that follows along marked long lines on the floor   CO1-U

(a) AGV   (b) Monorail   (c) Hoist   (d) Crane

10. Which factor does not affect project cash flow diagram?   CO1-U

(a) Margin   (b) Material Quality

(c) Certification Period   (d) Mobilization Advance

PART – B (5 x 2= 10Marks)

11. Define Accuracy and Repeatability   CO1-U

12. Outline stepper motor and its application   CO1-U

13. State the functions of Piezoelectric sensors   CO1-U

14. Define manipulator kinematics   CO1-U

15. List the different methods of cost analysis   CO1-U

PART – C (5 x 16= 80Marks)

16. (a) Describe with a neat sketch the four basic robot configurations, classified according to the coordinate system.   CO1 -U   (16)

Or

(b) Briefly explain about the four types of robot controls   CO1- U   (16)

17. (a) Discuss with neat sketch of permanent magnetic and electromagnetic gripper with merits and demerits.   CO1- U   (16)

Or

(b) Explain with neat sketch of robot end effector gripper mechanism.   CO1- U   (16)

18. (a) Describe the working principle of displacement sensors with neat sketch   CO1 -U   (16)

Or

(b) Illustrate the illumination technique of robot vision system.   CO1- U   (16)

99703

19. (a) LL Robot has two links of variable length as shown in figure   CO4- App   (16)
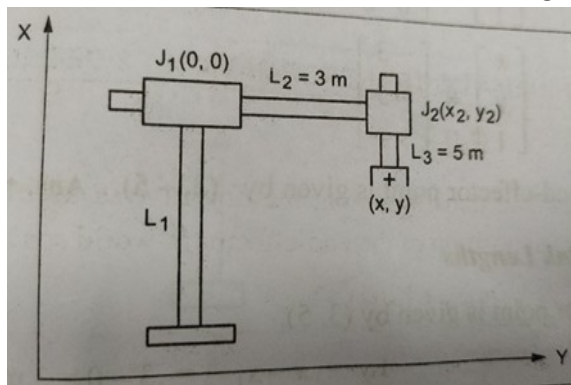
Determine (i) the coordinate of the end effector of link length 3 and 5m

         (ii) variable link length if end effector is located at (3,5)

Or

(b) Write a robot program for point to point path robot and to   CO4-App   (16) expanded in a pallet object

20. (a) Elaborate with neat sketch of Automated Guided Vehicle .   CO2- U   (16)

(b) Explain about the safety and maintenance required while   CO2 -U   (16) implementing robot in industries.

99703