Reg. No. :

Question Paper Code: 49724

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

Elective

Mechanical Engineering

14UME924-ROBOTICS

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. _____ is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes.

    (a) SCARA Robot   (b) Manipulator   (c) Yaw   (d) Industrial Robot

2. The device with hardware & software support for giving commands to the drives called

    (a) Controller   (b) Sensor   (c) Base   (d) Actuator

3. The _____ must not create any sort of distort and scratch in the fragile work parts

    (a) Path control   (b) Hydraulic drives   (c) Tools   (d) Gripper

4. Mechanical inaccuracy among the following

    (a) gear backlash   (b) leakage of hydraulic fluid

    (c) stretching of pulley cards   (d) all the above

5. Internal state sensors are used for measuring _____ of the end effector.

    (a) Position   (b) Position & Velocity

    (c) Velocity & Acceleration   (d) Position, Velocity & Acceleration

6. The work envelop is described by the surface of the

    (a) Work volume   (b) Work Done   (c) Work space   (d) Sensor

7. The amount of time required for the work cycle is

       (a) Robot cycle time analysis   (b)Robot time

       (c) Cell timing   (d)Machine cycle time

8. The robot which is located at the approximate center of the cell is called

       (a) Machine cell   (b) Robot centered work cell

       (c) Celll ayout   (d) DataInterpretation

9. The system used to move parts in the cell

       (a) Intermittent transfer   (b) synchronous transfer

       (c) Continuous transfer   (d) In-Line transfer

10. In which of the following categories of robot AVG placed

        (a)A uncontrolled robot   (b) A saturated robot

        (c) A mobile robot   (d) A natural robot

PART - B (5 x 2 = 10 Marks)

11. What is meant by Work space?

12. List out some examples of Robot End Effector.

13. Name some feedback devices used in robotics.

14. Define work cell.

15. What are the commercially available industrial robot?

PART - C (5 x 16 = 80 Marks)

16. (a) Elaborate the various parts of a robot and its anatomy with neat sketch.   (16)

Or

    (b) Explain with a neat Sketch about the four basic robot configurations classified according to the coordinate system.   (16)

17. (a) Explain the various drive system used with an industrial robot and compare their features, merits and demerits.   (16)

Or

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(b) Explain Pneumatic actuators system with neat sketch.   (16)

18. (a) Briefly explain the characteristics of Sensors.   (16)

Or

(b) Illustrate and explain the working principle of Proximity sensors with neat sketch.   (16)

19. (a) Experiment with an example which differentiates forward and inverse kinematics.(16)

Or

(b) Derive the expression for direct and inverse kinematics of 4 degrees of freedom robot manipulator   (16)

20. (a) Briefly explain the economic analysis of Robots in detail.   (16)

Or

(b) Briefly explains the various steps involved for implementing the robot in industries

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