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**Question Paper Code: 39724**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Elective

Mechanical Engineering

01UME924 - ROBOTICS

(Regulation 2013)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

- \_\_\_\_\_ is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes.  
(a) SCARA Robot      (b) Manipulator      (c) Yaw      (d) Industrial Robot
- The device with hardware & software support for giving commands to the drives called  
(a) Controller      (b) Sensor      (c) Base      (d) Actuator
- 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
- Mechanical inaccuracy among the following  
(a) gear backlash      (b) leakage of hydraulic fluid  
(c) stretching of pulley cards      (d) all the above
- Internal state sensors are used for measuring \_\_\_\_\_ of the end effector.  
(a) Position      (b) Position & Velocity  
(c) Velocity & Acceleration      (d) Position, Velocity & Acceleration
- 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) Cell layout      (d) Data Interpretation
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 (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. Give all possible classification of robots. (8)
12. Explain various types of Gripper mechanisms. (8)
13. Explain the necessary characteristics of a sensor. (8)
14. Given the world coordinates for a Backward transformation of a RR:R robot as  $x = 300 \text{ mm}$ ,  $z = 400 \text{ mm}$ , and  $\alpha = 30^\circ$ ; and given that the links have values  $L_1 = 350 \text{ mm}$ ,  $L_2 = 250 \text{ mm}$  and  $L_3 = 50 \text{ mm}$ , determine the joint angles  $\theta_1$ ,  $\theta_2$  and  $\theta_3$ . (8)
15. Briefly explain AGV and RGV types of robots in detail. (8)