Reg. No. : | | | | | | | | | | |

Question Paper Code: 39724

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

Elective

Mechanical Engineering

01UME924 - ROBOTICS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define Robot.
2. What are the benefits of industrial robots?
3. What is the difference between internal grippers and external grippers?
4. Give some examples of Robot End Effectors.
5. What are the basic classifications of sensors?
6. What is segmentation?
7. Name the robot programming methods.
8. Name any four MOTION commands in Robot programming language.
9. Describe pay back method to develop a robot with profit.
10. Define grippers.

PART - B (5 x 16 = 80 Marks)

11. (a) Give all possible classification of robots. (16)

Or

(b) Describe the anatomy of a robot. (16)

12. (a) Explain various types of Gripper mechanisms. (16)

Or

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

13. (a) Explain the necessary characteristics of a sensor. (16)

Or

(b) Explain the architecture of a robotic vision system. (16)

14. (a) Given the world coordinates for a Backward transformation of a RR:R robot as x = 300 *mm*, z = 400 *mm*, and α = 30°; and given that the links have values L_1 = 350 *mm*, L_2 = 250 mm and *L3* = 50 *mm*, determine the joint angles θ_1, θ_2 and θ_3. (16)

Or

(b) With an example differentiate forward and inverse kinematics. (16)

15. (a) Briefly explain AGV and RGV types of robots in detail. (16)

Or

(b) (i) Explain the levels of safety sensor systems and safety monitoring strategies that might be followed while using robots. (10)

(ii) List the steps to be followed to implement a robotics program in industries. (6)