

227302

May, 2019

M.Tech. (Mechanical Engg.) - 3rd SEMESTER

(Reappear)

ROBOTICS AND AUTOMATION (MME-203)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) What is automation? (1.5)
(b) Sketch an automatic transfer device when the transfer distance is very short. (1.5)
(c) Write two advantages of electrical control actuators. (1.5)
(d) What is the need of assembly automation? (1.5)
(e) Compare intelligent and non-intelligent robot. (1.5)
(f) Write two main features of robot programming language. (1.5)

- (g) How do you control force at gripper end? (1.5)
- (h) How do you automatically control various valve positions in robotic applications? (1.5)
- (i) Compare absolute and incremental encoders. (1.5)
- (j) What is robot repeatability? (1.5)

PART-B

2. (a) Describe all the robotic motion with a neat sketch. Explain various kinematic structures used in robot. (10)
- (b) Compare servo and non-servo manipulator. (5)
3. (a) Describe the pneumatic system for controlling the motion of robot. (5)
- (b) Derive an expression of hydraulic system for lifting load. (10)
4. (a) Describe the concept of artificial intelligence with a example. (10)
- (b) Consider a robot with 1 degree of freedom. It has one sliding joint with a full range of 2.0m. The robot control memory has a 8-bit storage capacity. Determine the control resolution for the axis of motion. (5)
5. (a) Classify automation system along with advantages and disadvantages. (10)
- (b) Describe force control of manipulators. (5)

6. (a) Write five common problems in hydraulic operated remote valve system. (5)
- (b) How pneumatic system assist in automatic die casting process? Sketch and explain. (10)
7. Describe two part orientation and two part feeding devices for components along with their applications. (15)