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M.Tech. (ME) (2017 Batch) (Sem.–2)

AUTOMATION & ROBOTICS

Subject Code : MTME-206

M.Code : 74982

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT question.**
2. **Each question carry TWENTY marks.**

1. a) What is automation? What it means to us around the world? Describe the basic elements of automation.

   b) Explain strategies for automation and production systems.

2. a) What are the levels of automation? Describe various types of automation based on flexibility.

   b) Discuss the various types of Directional control valves used in pneumatic systems with neat sketches.

3. a) Compare the constructional details and working principle of Pneumatic and Hydraulic Actuators use in robotics. Also, State their relative advantages and disadvantages.

   b) What do you understand by flexible manufacturing automation? Discuss the salient features of single station manufacturing cell giving an appropriate example.

4. a) What is automated assembly system? Explain the following automated assembly systems by their physical configurations:

   i) Dial-type assembly machine

   ii) In-line assembly machine

   iii) Carousel assembly system

   iv) Single-station assembly machine

b) What type of material transfer device are used in high volume production system? Also, explain the working of Geneva Mechanism.

5. a) Describe the relationship between robotics and automation. Explain with a neat sketch configuration of a robot.

b) Explain the following classifications of robots: by power source; by the shape of the work envelope; by the size of the robot; by the weight it can move; by the type of jobs it is optimized for; and by the type of drive system used to move the robot.

6. a) Explain any four types of robot programming. Name the important requirements of programming languages.

b) Explain the characteristics of various transmission systems used in industrial robotic arm along with their advantages and disadvantages.

7. a) Explain architecture of a Programmable logic controller with the help of neat sketch.

b) What is the need for feeders in automation systems? How feeders are classified? Explain the criteria for feeder selection and types of feeders used in industry.

8. a) Discuss the working of automated storage and retrieval systems for materials handling applications giving various configurations of ASRS systems.

b) What is artificial intelligence? Explain the concept of export system and its applications in Robotics.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.