

Industrial Automation and Robotics
(PE-408, DEC 2006)

Time: 3 Hrs
Max Marks: 60

Note: Section A is compulsory. Attempt any four questions from Section B and any two from section C.

Section-A

1. a) State the advantages of automating production operations.
b) Draw the cross sectional diagram of a two stage compressor with an intercooler.
c) Write the truth table for OR gate and draw the symbol for representing OR gate.
d) State the role of transfer devices in assembly operations.
e) Explain the constructional features of a micro controller.
f) List the different sensors used on robots.
g) By means of a sketch, explain the construction of a polar type of robot.
h) List at least four languages used for the programming of robots.
i) Distinguish between hydraulic and pneumatic systems.
j) Mention the technical parameters which aid the selection of a robot for a specific application.

Section-B

2. a) What is meant by condensation effect?
b) Sketch any fluidic device and explain its operation. State its applications.
3. a) Distinguish between transducers and a sensor.
b) By means of a neat sketch, describe the working of any piezoelectric sensor.
4. a) What is the importance of work envelope of a robot?
b) State the major sub-systems of a robot and their functions. Show these subsystems on a sketch.
5. a) With the aid of sketches, explain the constructional features of a hydraulic cylinder.
b) Draw the cross section of any position control spool valve and poppet valve.
6. a) What is the role of a teach pendant?
b) Wind shields made of glass are to be assembled on an automobile during manufacturing using a robot. State the types of end effectors to be used in the robot and describe its operation.

Section-C

7. Write an essay on the type of robot used in spray painting application.
8. Write notes on the languages available, features required of programming language and classification of commands in respect of robot programming languages.
9. Write short notes on (a) Applications of hydraulics automation (b) Criteria used for the design of pneumatic systems.