

Total No. of Questions : 12]

SEAT No. :

**P747**

[Total No. of Pages : 4

**[4659] - 53**

**B.E. (Mechanical) (Semester - II)**

**INDUSTRIAL AUTOMATION**

**(Open Elective) (2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 100*

*Instructions to the candidates:-*

- 1) Answer three questions from section I and three questions from section II.*
- 2) Answers to the each section should be written in separate books.*
- 3) Draw neat suitable diagrams, wherever necessary.*
- 4) Figures to the right indicate full marks.*
- 5) Use of electronic pocket calculator is allowed.*
- 6) Assume suitable data, if required.*

**SECTION - I**

**Unit - I**

- Q1)** a) Explain types of automation and benefits of automation? **[8]**
- b) How control system is designed for industrial automation? Explain step by step procedure for control design? **[7]**

OR

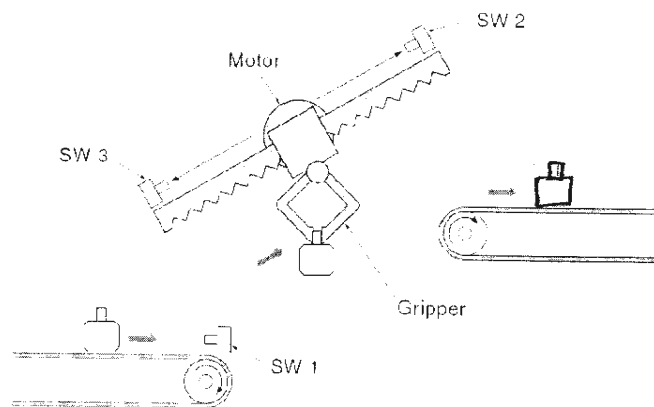
- Q2)** a) Explain types of automation and benefits of automation? **[8]**
- b) Explain Industrial Automation Types **[7]**
- i) Fixed Automation
  - ii) Programmable Automation
  - iii) Flexible Automation

**P.T.O.**

## Unit - II

**Q3) a)** Explain 7 step method for ladder development? [5]

b) A simple pick - and - place robot picks up parts from one conveyer belt and placethem on another belt, as shown in Figure (a). When a part moving along the lower conveyer belt activates Switch 1, a solenoid - powered gripper clamps on the part and carries it toward the upper conveyer belt. When the gripper reaches Switch 2, it releases the part and moves back (empty) to receive the next part. When the gripper reaches Switch 3, it halts and waits for the next part to start the cycle all over again. Draw the relay logic ladder diagram to control this operation. [10]



OR

**Q4) a)** Short Notes on: [5]

- i) DCS Architecture
- ii) DCS Function levels

b) In a certain bank, each of three bank officers has a unique key to the vault. The bank rules require that two out of the three officers be present when the vault is opened. Draw the ladder diagram for a relay logic circuit that will unlatch the door and turn on the light when two of the three keys are inserted. [10]

## Unit - III

**Q5) a)** What makes the FMS flexible? Define types of flexibility and explain its dependent factors. [12]

b) Write a note on ASRS (Automated storage and retrieval system) Material Storage system? [8]

OR

- Q6)** a) Explain with neat sketch simple data communication structure? And Define
- i) Communication
  - ii) Protocol [8]
- b) Explain Automated guiding systems used in manufacturing systems. [7]
- c) What are components of manufacturing system? [5]

**SECTION - II**

**Unit - IV**

- Q7)** a) Explain Necessity of SCADA system over simple Automation and explain components of SCADA system? [8]
- b) Explain : [7]
- i) Stepper Motor
  - ii) Induction Motor
  - iii) VFD

OR

- Q8)** Write short note on (Any three) [15]
- a) Compare SCADA and HMI
  - b) Alarm Management System
  - c) Historical database management
  - d) Security and user access management

**Unit - V**

- Q9)** a) Explain working of stepper motor with neat sketch. [8]  
b) Factors to be consider for selection of drives? [7]

OR

- Q10)** a) Explain working of Geneva Mechanism and its use in automation with neat sketch . [7]  
b) Short Note on [8]  
i) DC servo systems  
ii) BLDC and their control system

**Unit - VI**

- Q11)** a) What are the general considerations in robot material handling? [12]  
b) What are the types of assembly system configuration and explain any one? [8]

OR

- Q12)** Write a short Notes on [20]  
a) Universal Hand  
b) Automation for drilling machine  
c) Automation in Conveyor Belts  
d) Automation Machine Loading and Unloading

