

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain closed loop system with a suitable example. (4)
- (ii) Explain the following terms.
Nonlinearity error, Repeatability, Dead band/time, output impedance. (3 × 4 = 12)

Or

- (b) (i) Explain how strain gauges are used as sensors and discuss two types of strain gauge elements. (8)
- (ii) Explain the working principle of LVDT with neat sketch and necessary graphs. (8)
12. (a) Explain the working principle of the following sensors :
- (i) Hall effect sensor (8)
- (ii) Pyro electric sensor. (8)

Or

- (b) Discuss with diagrams the working of three proximity sensors. (16)
13. (a) (i) Draw the pin diagram of I 8085 microprocessor. (8)
- (ii) How a microprocessor can be used for traffic light control? Discuss in detail. (8)

Or

- (b) Draw the architecture diagram of I 8085 microprocessor and discuss the individual elements. (16)
14. (a) (i) With a suitable example explain the PLC programming with a ladder diagram. Explain all ladder symbols. (6)
- (ii) Develop a PLC program to control a system with a conveyor belt, which is used to move an item to a workstation. The presence of the item at the workstation is detected by means of breaking a contact activated by a beam of light to a photosensor. There it stops for 100s for an operation to be carried out before moving on and off the conveyor. The motor for the belt is started by a normally open start switch and stopped by a normally closed switch. (10)

Or

- (b) Explain the following with suitable applications. (4 × 4 = 16)
- (i) Latching
- (ii) Timers
- (iii) Internal relays
- (iv) Counters.

15. (a) With the help of block diagram, clearly explain how a mechatronic system can be developed for a car park barrier.

Or

- (b) With the help of block diagram, clearly explain how a mechatronic system can be designed for a pick and place robot.
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