



(3 Hours)

[Total: 80 marks]

N.B.

1. **Question 1 is compulsory.**
2. Attempt **any three** questions from the remaining five questions.
3. Assume suitable data, if necessary.
4. **Figures/sketches** carry weightage.

- Q1 a. Differentiate between Capital- Intensive Vs Low Cost automation. **5**
 b. Explain in detail Basic elements of an automated system. **5**
 c. Write note on Components of FRL Unit. **5**
 d. Explain the types of temperature sensor, also select the sensor based on the parameters (a) Accuracy (b) Sensitivity. **5**
- Q2 a. Design electro pneumatic circuit for three cylinder operation with following sequence using 4/2 both side solenoid operated valve as DCV. **12**
 A+ B+ C+ C- B- A- (with grouping)
 With user selection option single cycle & Multicycle operation. Apply the emergency condition when applied all the three cylinders must reach their home positions.
- b. Explain with a neat sketch various parts and working of vibratory bowl. **8**
- Q3 a. Write detail note on Robot Configurations with respect to joints, applications, advantages & Disadvantages. (any three) **10**
 b. Design simple hydraulic circuit for two cylinder operation with following sequence using 4/2 both side pilot operated valve as DCV. **10**
 A+ B+ C+ B- A- DELAY C-
 With user selection option single cycle & Multicycle operation.
- Q4 a. List & Discuss Ten strategies of automation & Production system **10**
 b. Differentiate between PLC & Relay operation **5**
 c. Differentiate between Continuous verses discrete control **5**

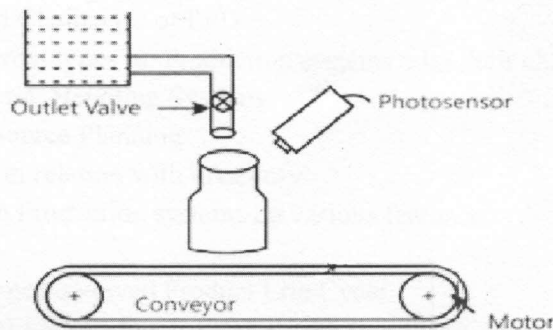
Q5 a. Design PLC Ladder diagram for water bottle filling mechanism

15

Process Description:

Whenever bottles are placed on the conveyor, motor starts and conveyor moves and when photo sensor senses the bottle, motor stops and outlet valve opens for 30 sec. After 30 sec valve is closed, motor starts and conveyor moves. When another bottle is detected, the process is repeated. Implement this in PLC using Ladder Diagram programming language.

Refer following figure



b. Write short note on acceleration sensor

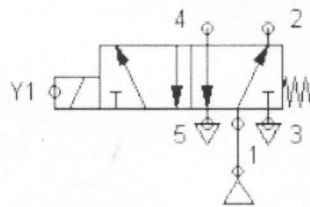
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Q6 Write short note on following (5 marks each)

20

a. Brushless DC Motors

b. Identify following valve specification & discuss in detail.



c. AS/RS system

d. Applications of robot
