

	(c) State major limitation of using PLC. Explain any three in detail.	4
Q-5	Attempt all questions	(14)
	(a) Draw the ladder logic programs for following logic gates 1. AND 2. OR 3. EX-NOR 4. NAND	7
	Express each of the following equations as a ladder logic program: 1. $Y = \overline{AB} + \overline{CD} + \overline{CBE}$ 2. $Y = (A+BC)DE$ 3. $Y = ABC + DE + \overline{E}$	
	(b) Write short notes on Programming Word Level Logic Instructions.	7
Q-6	Attempt all questions	(14)
	(a) Explain in detail with examples different relay type instructions.	7
	(b) Explain in detail with ladder program example PLC program scan cycle.	7
Q-7	Attempt all questions	(14)
	(a) Explain in detail with example cascading of timers.	7
	(b) Classify data manipulation instructions into two broad categories. Explain data transfer operations in detail with examples.	7
Q-8	Attempt all questions	(14)
	(a) Describe the operation of the master control reset instruction and develop an elementary program illustrating its use	7
	(b) Discuss the factors to be considered in selecting a PLC.	7

