CBCS SCHEME

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BEE714C

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Programmable Logic Controllers

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Describe the typical parts of Modular type PLC with a neat block diagram.	7	L2	CO1
	b.	Explain Allen-Bradley SLC500 controller rack/slot addressing format and also compare SLC500 rack/slot based addressing and control Logix5000 tag based addressing.	6	L3	CO1
	c.	Discuss different PLC programming languages defined by IEC-61131.	7	L2	CO1
		OR			
Q.2	a.	Describe PLC program scan cycle.	7	L2	CO1
	b.	Explain Examine If Closed (XIC) and Examine If Open (XIO) instructions.	6	L3	CO1
	c.	With general structure of a HMI package, discuss Human Machine Interfaces (HMI).	7	L2	CO1
		Module – 2			
Q.3	a.	Explain seal in circuit concept with an example of controlling an electric motor.	6	L2	CO1
	b.	For the relay schematic shown in Fig.Q3(b), develop the PLC ladder logic program and summarize the operation.	7	L3	CO1

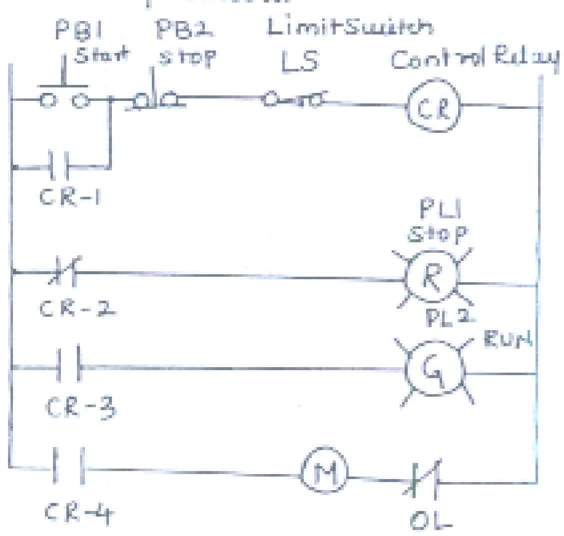

Fig. Q3(b)

			M	L	C
	c.	Develop ladder logic program and a typical I/O connection diagram for the following motor control specifications. i. A motor must be started and stopped from any one of the three start/stop push button stations. ii. Each start/stop station contains one NOStart push button and one NCStop push button iii. Motor OL contacts are to be hard wired.	7	L2	CO1

		OR			
Q.4	a.	Explain On-delay timer circuit that uses a Normally Open, Timed Closed (NOTC) contact and off-delay timer circuit that uses A Normally Open, Timed Open (NOTO) contact with timing diagram.	6	L2	CO2
	b.	Develop PLC ladder logic program to control traffic lights in one direction by using timers.	7	L3	CO2
	c.	Develop the ladder program for switching three motors off sequentially at 5 sec intervals using off-delay timer.	7	L3	CO2
		Module – 3			
Q.5	a.	Design a PLC program to turn the red light on and green light off after an accumulated count of 7. Draw the timing diagram for the same.	7	L3	CO3
	b.	Discuss MCR instruction with ladder logic program.	7	L2	CO3
	c.	Design a PLC program to control 3 pilot lamps using jump instruction and explain its operation.	6	L3	CO3
		OR			
Q.6	a.	Design a PLC program for automatic stacking that required both a timer and counter. Explain its operation.	7	L3	CO3
	b.	Discuss safety wiring requirements for a PLC installation with wiring diagram.	7	L2	CO3
	c.	Design PLC program for extremely large counts using method of cascading counters.	6	L3	CO3
		Module – 4			
Q.7	a.	Explain the parameters of File Arithmetic and Logic [FAL] instruction.	10	L2	CO4
	b.	How MUL (multiply) instruction used as a part of temperature control program. Discuss with PLC program.	10	L2	CO4
		OR			
Q.8	a.	Explain data compare instructions EQU, NEQ, GRT, LES and GEQ.	10	L2	CO4
	b.	How subtraction (SUB) instruction can be used to indicate a vessel overfill condition. Discuss with PLC program.	10	L2	CO4
		Module – 5			
Q.9	a.	Illustrate the PLC sequencer commands and its parameters.	10	L2	CO5
	b.	Explain Bit Shift Left (BSL) and Bit Shift Right (BSR) instructions with suitable example.	10	L2	CO5
		OR			
Q.10	a.	Discuss the structure of control systems.	10	L2	CO5
	b.	Explain the concept of supervisory control and data acquisition system used in an industry.	10	L2	CO5

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