



# Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



## SEVENTH SEMESTER B.TECH (INSTRUMENTATION AND CONTROL ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2015

### SUBJECT: LOGIC AND DISTRIBUTED CONTROL SYSTEMS (ICE-413)

#### Time: 3 Hours

#### MAX. MARKS: 50

	Instructions to Candidates:	]
	Answer ANY FIVE FULL questions.	
	<ul> <li>Missing data may be suitably assumed.</li> </ul>	
1A.	Define the effects of aliasing in data sampling with the help of graph.	(5)
1 <b>B</b> .	Brief the standard programming languages of PLCs system	(3)
1C.	Explain the following Allen Bradley instructions	(2)
	i) ACS	
	ii) SQR	
	iii) LIM	
	iv) CPT	
2A.	Describe the CPU Power supply module of PLC with block diagram.	(3)
2 <b>B</b> .	With neat flow chart, explain the discrete PID controller.	(4)
2C.	Write a ladder logic program for the following.	(3)
	- When button A is pushed, a light will flash for 5 seconds.	
	- The flashing light will be on for 0.25 sec and off for 0.75 sec.	
	- If button A has been pushed 5 times the light will not flash until the system is Reset.	
	- The system can be reset by pressing button B.	
3A.	Explain with the help of the ladder diagram for 8 lines SKIP function PLC Operation.	(4)
3B.	Explain the PLC Input Group (IG) register scheme for 1-16 –(-IG 001), 17-32 (IG	(4)
	002).	
3C.	Write ladder logic for liquid level controller. Liquid level system consists of two	(2)
	level sensors A, B and a motor. A is located at top of the tank and B is located at	
	middle of the tank. Initially tank is empty. When the tank is empty motor should on	
	until liquid level in a tank reaches to level sensor A. If liquid level reached to sensor	

A then motor should be in OFF condition and the motor should be in same condition

until liquid level drops to sensor B. when liquid level reached to sensor B, again motor should be ON until level reaches to A. Use one start and stop buttons. Draw the truth table for this liquid level controller.

4A.	Explain in details about the types of blocks used in a user application in field bus .	(4)
4 <b>B</b> .	Explain functional requirements of a DCS.	(4)
4C.	Explain different types of HART commands.	(2)
5A.	Explain the significance and principle of the FSK modulation in HART protocol.	(5)
5B.	Explain different types of display formats used in DCS.	(5)
6A.	Explain in details about the Leeds and North up Max-I DCS system.	(4)
6B.	With neat diagram, explain split range communication network used in HART	(4)
	protocol.	
6C.	With neat diagrams, explain Siemen's auxiliary instructions.	(2)

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