MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

## SEVENTH SEMESTER B. TECH (ELECTRONICS AND INSTRUMENTATION) PROCTORED ONLINE END SEMESTER EXAMINATION Dec. 21/Jan. 22

SUBJECT: Industrial Automation (ICE 4302)

TIME: 2.20 to 3.45 PM

DATE: 1-1-2022

MAX MARKS 20

## Note: Answer All questions.

1	A	Create a ladder logic program that will start when input <i>A</i> is turned on and calculate the series below. The value of <i>n</i> will start at 0 and with each scan of the ladder logic <i>n</i> will increase by 2 until n=20. While the sequence is being incremented, any change in <i>A</i> will be ignored. X=2 (log(n)-1)	3
	В	A motor will be connected to a PLC and controlled by two switches. The GO switch will start the motor, and the STOP switch will stop it. If the motor is going, and the GO switch is thrown, this will also stop the motor. If the STOP switch was used to stop the motor, the GO switch must be thrown thrice to start the motor. When the motor is running, a light should be turned on (a small lamp will be provided). [use retentive type counter]	4
	С	Illustrate different IS methods available in HART protocol.	3
2	A	Define latching. Explain different types of latching techniques. According to industrial standard which latching technique is recommended for a safety process. reason it?	3
	В	Consider the control of a heating oven. The system is started with a Start button that seals in the Auto mode. This can be stopped if the Stop button is pushed. (Remember: Stop buttons are normally closed.) When the Auto goes on initially the TON timer is used to sound the horn for the first 10 seconds to warn that the oven will start, and after that the horn stops and the heating coils start. When the oven is turned off the fan continues to blow for 300s or 5 minutes after. [use non retentive type timer]	4
	С	In dangerous processes it is common to use two palm buttons that require a operator to use both hands to start a process. To develop this there are two inputs that must be turned on within 0.25 sec of each other before a machine cycle may begin.	3