Reg. No.



## VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING) END SEMESTER EXAMINATIONS, DECEMBER 2020

## **INDUSTRIAL AUTOMATION AND CONTROL [ELE 4015]**

REVISED CREDIT SYSTEM

Time	: 3 Hours	Date: 26 December 2020	Max. Mark	ks: 50
Instructions to Candidates:				
	<ul> <li>Answer ALL the questions.</li> </ul>			
<ul> <li>Missing data may be suitably assumed.</li> </ul>				
1A.	Define Automation. Expla diagram.	in a typical industrial product life cycle wit	h neat	(04)
1B.	A controller outputs a 4- 600 rpm with a linear dep	to 20-mA signal to control motor speed fro pendence. Calculate	om 140 to	
	(a) current corresponding	ı to 320 rpm		
	(b) The value of (a) expre	essed as the percent of control output.		(02)
1C.	Explain the characteristic control action when it is diagram	s of Proportional mode and the improvisat used in combination with integral mode	ion in the with neat	(04)
2A.	Explain feed forward cor control to control a gase under controlled temperation	ntrol with a block diagram. Design a fee eous flow inside a chemical tank reactor ture	d forward operating	(04)
2B.	Describe the input module	e o PLC with neat diagram.		(03)
2C.	For an oven heating contro- considerations. The syster 'Auto' mode. This can be Stop buttons are normal should sound for the first that, the horn stops and is turned off, the fan cont	ol system, develop the ladder logic with the em is started with a 'Start' button that se stopped if the 'Stop' button is pushed. (Re Ily closed.) When the 'Auto' goes on init 10 seconds to warn that the oven will start, the heating coils and the fan starts. When inues to blow for 5 minutes after.	e following als in the emember: ially horn and after the oven	(03)
3A.	A classroom has a capac doors, and two proximity Exit. When the number of door has a Greenlight on in the classroom is 120 of Greenlight which indicate capacity and is full.	tity of a maximum of 120 students. There sensors are placed one for Entry and the students in the classroom is less than 120, it which remains ON. When the number of r more than that, Red light goes ON turnin es that the classroom has reached its	e are two other for the Entry f students g OFF the maximum	(03)
ЗВ.	Develop a suitable ladder concentrate process as sh to the tank is to be turn between the high and low concentrated solution, wh	r logic to control the fluid level in a boil do own in figure Q3B. The feed pump supplyin ed ON/OFF to maintain the liquid level in a level switches. Steam is used to boil the pich is drained off periodically by manual	own liquid g the fluid the tank liquid to a	(03)

the drain valve at the bottom of the tank.

- 3C. Explain the working of a retentive type on delay timer with help of neat timing diagram. Also develop the PLC ladder logic for flashing an LED continuously with a delay of 1 sec until the stop button is pressed. (Use only one retentive type timer)
- **4A.** Explain in detail the various types of tasks undertaken by a real time operating system giving an example for each
- **4B.** With neat diagram explain the various components of a typical air to close pneumatic control valve. Also illustrate the significance of valve sizing with different flow rates.
- **4C.** Explain the various architectures of the SCADA system employed for the process shown in Figure Q4C. **(02)**
- **5A.** What is DCS? Explain in detail the hierarchy of DCS with neat diagram (04)
- **5B.** Explain the architecture of Fieldbus with respect to OSI model (02)
- **5C.** List the characteristics of RS-232 protocol. Also explain the frame format and control signals for communication of data using RS232 bus. **(04)**



(04)

(04)