Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

School of Computer Science amd Engineering

Mid - Term Examinations - November 2024

Semester: VII **Date**: 05/11/2024

Course Code: ECE 3086 **Time**: 09.30am to 11.00am

Course Name: Industrial Internet of Things **Max Marks**: 50

Program: B. Tech **Weightage**: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2 marks. 5Qx2M=10M

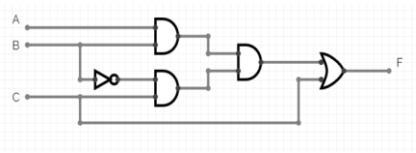
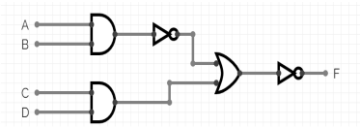
1	The fundamental structure of IIoT is based on the implementation of Cyber Physical System (CPS). Define the concept of CPS in the IoT domain.	2 Marks	L1	CO1
2	Explain the role of actuator in cyber security.	2 Marks	L1	CO1
3	State the four basic structures associated with Industrial Internet of Things.	2 Marks	L2	CO2
4	Explain the concept of Industrial Internet with application domain and protocols used.	2 Marks	L2	CO3
5	Industry 4.0 concept is heavily based on automation and expert systems. State the advantages of industrial automation in modern factories and production workshops.	2 Marks	L3	CO4

Part B

Answer ALL Questions. Each question carries 10 marks. 4QX10M=40M

6	6a	Programmable Logic Controllers (PLCs) play an important role in modern day automation industry. State some of the advantages and applications of PLCs in modern factories.	3 Marks	L1	CO1

	6b	Explain the concept of the factories of the future. What are the various components necessary to implement the future factories.	3 Marks	L1	CO2
	6c	Briefly discuss on the strategies of Industry 4.0 that are required to be implemented for IIoT.	4 Marks	L2	CO3
		or			
7	7a	Explain the concept of smart factories of the future in the IoT domain.	3 Marks	L1	CO1
	7b	What are connected factories ? Explain in brief how connected factories are going to impact the future industries.	3 Marks	L2	CO2
	7c	Discuss on the idea of virtual reality in future virtual factory scenario.	4 Marks	L3	CO4
8	8a	Discuss on the communication methods of IoT devices laid by the International Telecommunication Union (ITU).	3 Marks	L2	CO2
	8b	State the general architecture requirement of IoT in ITU model.	3 Marks	L2	CO3
	8c	Draw the general (I)IoT reference model proposed by ITU, clearly showing the vertical and horizontal layers.	4 Marks	L3	CO4
		or			
9	9a	Explain the Industrial Internet Consortium (IIC) approach of IIoT architecture implementation.	3 Marks	L1	CO1
	9b	Briefly state and explain the various IIC reference architecture domains related to IIoT.	3 Marks	L2	CO3
	9c	Draw the general (I)IoT reference model proposed by IIC, clearly showing the vertical and horizontal layers.	4 Marks	L3	CO4
10	10a	Draw the block diagram of the Cyber Physical System, showing the roles of sensors and actuators.	3 Marks	L1	CO2
	10b	Explain the differences between the IIC reference architecture and ITU model of IIoT.	3 Marks	L3	CO3
	10c	Enumerate the Applications and challenges in implementation of IIoT in future industries and factories.	4 Marks	L3	CO4
		or			

11	11a	Draw the basic block diagram of a PLC system, showing the bidirectional and unidirectional buses.	3 Marks	L2	CO1
	11b	State some disadvantages of using PLC systems in modern day automation industry 4.0.	3 Marks	L2	CO2
	11c	Explain with a proper diagram, the concept of industrial automation required for industry 4.0 applications.	4 Marks	L3	CO3
12	12a	A 3-input digital logic gate is used for some application in industrial automation. The output becomes HIGH, for odd number of LOWs in the input. Identify the logic gate and draw its symbolic diagram.	3 Marks	L2	CO3
	12b	Identify how to use an XOR gate as a buffer and an inverter.	3 Marks	L3	CO4
	12c	 For the above industrial digital circuit, write a Boolean expression of the output with respect to the inputs a, b and c.	4 Marks	L3	CO4
		or			
13	13a	Explain in details why the NAND and NOR logic gates are known as Universal gates.	3 Marks	L1	CO3
	13b	With the help of a neat block diagram, explain the concept of multiplexers in combinational logic. State atleast one application of multiplexer.	3 Marks	L1	CO4
	13c	 For the above industrial digital circuit, write a Boolean expression of the output with respect to the inputs a, b c, and d.	4 Marks	L3	CO4