SREE VIDYANIKETHAN ENGINEERING COLLEGE
(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)
IV B.Tech I Semester (SVEC-20) Regular Examinations - November / December 2024
INDUSTRIAL INTERNET OF THINGS
IT (IoT)

Time: 3 hours   **Max. Marks: 70**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I						
1.	a)	Define the drivers of Industry 4.0. Discuss the different drivers of Industry 4.0.	7 Marks	BL1	CO1	PO2

	b)	Illustrate briefly about
		  i) Industrial Revolution
		  ii) Internet Revolution
			7 Marks	BL1	CO1	PO2

(OR)						
2.	a)	Define IIC? Discuss the main objectives of IIC.	7 Marks	BL1	CO1	PO1
	b)	Discuss about cybersecurity? Write the primary constituents of cybersecurity?.	7 Marks	BL1	CO1	PO1
UNIT-II						
3.	a)	Define IIRA? Discuss the basic architecture of IIRA	7 Marks	BL2	CO2	PO2
	b)	Describe the cloud platform developed by General Electric Predix. Discuss their unique features.	7 Marks	BL2	CO2	PO1
(OR)						
4.	a)	Discuss the data flow in a three-layered IIoT architecture.	7 Marks	BL1	CO2	PO1
	b)	What are the various AR-based technologies? Discuss one of them	7 Marks	BL2	CO2	PO1
UNIT-III						
5.	a)	Illustrate Briefly about i) Thermal Sensors ii) Optical Sensors	7 Marks	BL1	CO3	PO2
	b)	Discuss how is a hydraulic actuator different from pneumatic actuators?	7 Marks	BL2	CO3	PO2
(OR)						
6.	a)	Discuss how do acoustic sensors convert sound to energy/electrical signals?	7 Marks	BL3	CO3	PO2
	b)	Discuss the different types of pneumatic actuators?	7 Marks	BL2	CO3	PO2
UNIT-IV						
7.	a)	Discuss how does a CAN work? How is CC-Link IE control different from the CC-Link IE Field?	7 Marks	BL1	CO4	PO1
	b)	Discuss the differences between DCS and SCADA?	7 Marks	BL2	CO4	PO1
(OR)						
8.	a)	Differentiate between HART and Wireless HART.	7 Marks	BL2	CO4	PO1
	b)	Discuss the importance of industrial control systems?	7 Marks	BL2	CO4	PO1

		UNIT-V				
9.	a)	Define condition-based monitoring? Discuss how IIoT analytics assist in the same?	7 Marks	BL2	CO5	PO1
	b)	How are different types of ML algorithms classified?	7 Marks	BL2	CO5	PO1
		(OR)				
10.	a)	Explain the impact of data analytics in industries?	7 Marks	BL2	CO5	PO1
	b)	Define machine learning? Discuss the specific applications of ML in industries?	7 Marks	BL1	CO5	PO1

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UNIT-I						
1.	a)	Explain the socio-economic factors of sustainability in Industry 4.0?	7 Marks	BL1	CO1	PO2
	b)	List some of the applications of Industry 4.0?	7 Marks	BL2	CO1	PO2
(OR)						
2.	a)	Explain the impacts of the industrial revolution?	7 Marks	BL2	CO1	PO1
	b)	Illustrate briefly about the essential elements of Industrial Internet?	7 Marks	BL1	CO1	PO1
UNIT-II						
3.	a)	Discuss how are IIRA frameworks classified?	7 Marks	BL2	CO2	PO2
	b)	Discuss the general characteristics of the fog layer in industries?	7 Marks	BL2	CO2	PO1
(OR)						
4.	a)	Define a reference architecture. Discuss the principles of the reference architecture in IoT scenario.	7 Marks	BL2	CO2	PO1
	b)	Describe the basic components for the acquisition of big data?	7 Marks	BL2	CO2	PO1
UNIT-III						
5.	a)	Discuss briefly about the various types of optical sensors?	7 Marks	BL3	CO3	PO2
	b)	List the applications of hydraulic actuators and explain briefly?	7 Marks	BL2	CO3	PO1
(OR)						

6.	a)	Briefly explain about
		  i) Hydraulic Actuators
		  ii) Electromechanical Actuators
			7 Marks	BL3	CO3	PO2

	b)	Explain the various categories of thermal sensors?	7 Marks	BL2	CO3	PO2
UNIT-IV						
7.	a)	Differentiate between the Profibus and the Interbus.	7 Marks	BL1	CO4	PO1
	b)	What differentiated the IEEE 802.11AH from other wireless standards	7 Marks	BL2	CO4	PO1
(OR)						
8.	a)	Discuss how Foundation Fieldbus different from ISA100.11A?	7 Marks	BL2	CO4	PO1
	b)	Differentiate between PLC and SCADA.	7 Marks	BL2	CO4	PO1

		UNIT-V				
9.	a)	Give some industrial use cases of various analytics in the industrial sector?	7 Marks	BL2	CO5	PO1
	b)	Discuss the advantages of data science in industries?	7 Marks	BL2	CO5	PO1
		(OR)				
10.	a)	Discuss how are the analytics mapped with IIRA architecture?	7 Marks	BL2	CO5	PO1
	b)	Explain how are the weights updated in deep learning methods?	7 Marks	BL1	CO5	PO1

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Answer One Question from each Unit
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		UNIT-I				
1.	a)	Explain about the technical innovations form the physical technical driver of Industry 4.0?	7 Marks	BL2	CO1	PO2
	b)	Discuss briefly about the Cyber security threats?	7 Marks	BL2	CO1	PO2
		(OR)				
2.	a)	Describe the design requirements of Industry 4.0.	7 Marks	BL2	CO1	PO1
	b)	Illustrate briefly about the applications of IIoT?	7 Marks	BL1	CO1	PO1
		UNIT-II				
3.	a)	What is VR? Discuss the key features of VR?	7 Marks	BL2	CO2	PO2
	b)	Briefly discuss why is the cloud platform required in various industrial sectors?	7 Marks	BL2	CO2	PO1
		(OR)				
4.	a)	Discuss the challenges to be experienced in IIoT-based business models	7 Marks	BL2	CO2	PO1
	b)	Discuss the necessity of fog computing in industrial analytics?	7 Marks	BL2	CO2	PO1
		UNIT-III				
5.	a)	Discuss how are resistive temperature sensors different from thermocouples?	7 Marks	BL3	CO3	PO2
	b)	Discuss how are actuators different from sensors?	7 Marks	BL2	CO3	PO1
		(OR)				
6.	a)	Discuss briefly about any two types of sensors with neat sketch?	7 Marks	BL3	CO3	PO2
	b)	Discuss the use of gears in electromechanical actuators?	7 Marks	BL2	CO3	PO2
		UNIT-IV				
7.	a)	Explain what is the most promising feature of the NB-IoT protocol?	7 Marks	BL1	CO4	PO1
	b)	What is a DCS? Discuss how is a DCS different from PLC?	7 Marks	BL2	CO4	PO1
		(OR)				
8.	a)	Discuss the differentiates LonWorks from Devicenet?	7 Marks	BL2	CO4	PO1
	b)	Discuss Briefly about Human Machine Interface (HMI)?	7 Marks	BL2	CO4	PO1

		UNIT-V				
9.	a)	Explain how IIoT analytics help in various industries?	7 Marks	BL2	CO5	PO1
	b)	What are the various types of attributes of data? Give examples of each type in industry?	7 Marks	BL2	CO5	PO1
		(OR)				
10.	a)	Write a case study on the application of analytics in healthcare.	7 Marks	BL2	CO5	PO1
	b)	Discuss what are the common methods used for classification in deep learning?	7 Marks	BL1	CO5	PO1

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		UNIT-I				
1.	a)	Discuss the features of sustainability in manufacturing industries?	7 Marks	BL2	CO1	PO2
	b)	Illustrate briefly about i)Autonomous Vehicles ii) Advanced Robotics	7 Marks	BL2	CO1	PO2
		(OR)				
2.	a)	Summarize the primary factors behind globalization in manufacturing industries?	7 Marks	BL2	CO1	PO1
	b)	Explain various requirements of Cybersecurity?	7 Marks	BL1	CO1	PO1
		UNIT-II				
3.	a)	Discuss the basic architecture of the fog layer in industries.	7 Marks	BL2	CO2	PO2
	b)	Discuss in brief the application of fog layer in (a) transportation industry and (b) smart grid	7 Marks	BL2	CO2	PO1
		(OR)				
4.	a)	Discuss the software development firms utilize cloud platforms? Discuss the various products of any of these firms	7 Marks	BL2	CO2	PO1
	b)	Explain how AR technologies are applied in the field of healthcare?	7 Marks	BL2	CO2	PO1
		UNIT-III				
5.	a)	Discuss the various types of gas sensors?	7 Marks	BL3	CO3	PO2
	b)	Discuss the different types of hydraulic actuators?	7 Marks	BL2	CO3	PO3
		(OR)				
6.	a)	Differentiate between sensor resolution and its accuracy.	7 Marks	BL3	CO3	PO2

	b)	With neat sketch explain about
		   i) Thermal Actuators
		   ii) Pneumatic Actuators
			7 Marks	BL2	CO3	PO2

		UNIT-IV				
7.	a)	Differentiate between ISA100.11A and Wireless HART.	7 Marks	BL1	CO4	PO1
	b)	Discuss the importance of industrial control systems?	7 Marks	BL2	CO4	PO1
		(OR)				
8.	a)	Illustrate about Batibus? Discuss how is LoRaWAN different from LoRa?	7 Marks	BL2	CO4	PO1

	b)	Summarize about DCS? Discuss how is a DCS different from PLC?	7 Marks	BL2	CO4	PO1
		UNIT-V				
9.	a)	Discuss the various challenges faced in the application of analytics in industries?	7 Marks	BL2	CO5	PO1
	b)	Discuss the applications of AI in manufacturing industries?	7 Marks	BL2	CO5	PO1
		(OR)				
10.	a)	Discuss the necessary conditions required for the application of analytics in industries.	7 Marks	BL2	CO5	PO1
	b)	Discuss how deep learning methods are applied in Toshiba? Discuss some of the AI analysis methods used by Toshiba.	7 Marks	BL1	CO5	PO1

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		UNIT-I				
1.	a)	Discuss the differences between IIoT and traditional automation.	7 Marks	BL1	CO1	PO2
	b)	Explain the various industrial applications of Industry 4.0	7 Marks	BL1	CO1	PO2
		(OR)				
2.	a)	Discuss how does Industrial Internet affect global energy consumption?	7 Marks	BL1	CO1	PO1
	b)	Discuss the significant impacts of Industry 4.0	7 Marks	BL1	CO1	PO1
		UNIT-II				
3.	a)	Describe the cloud platform developed by General Electric Predix. Discuss their unique features.	7 Marks	BL1	CO2	PO2
	b)	What are smart factories? Discuss the different types of analytics methods?	7 Marks	BL1	CO2	PO1
		(OR)				
4.	a)	Discuss the key features and military applications of AR?	7 Marks	BL1	CO2	PO1
	b)	What is big data? Discuss how is big data categorized? Give some examples of each type	7 Marks	BL1	CO2	PO1
		UNIT-III				
5.	a)	Discuss how are actuators different from sensors?	7 Marks	BL1	CO3	PO2
	b)	Compare the difference between a traveling-nut type and a traveling screw type linear actuator?	7 Marks	BL2	CO3	PO1
		(OR)				
6.	a)	Explain what happens if a sensor is operated outside its permissible rating	7 Marks	BL1	CO3	PO2
	b)	Discuss how does a thermal actuator operate? What are the various mechanisms for thermal actuation?	7 Marks	BL1	CO3	PO2
		UNIT-IV				
7.	a)	Describe the primary functions of the Neuron chip in the LonWorks protocol?	7 Marks	BL1	CO4	PO1
	b)	Differentiate between PLC and SCADA.	7 Marks	BL2	CO4	PO1
		(OR)				
8.	a)	Discuss the crucial components of a Foundation Field Bus?	7 Marks	BL1	CO4	PO1
	b)	Compare the differences between DCS and SCADA?	7 Marks	BL2	CO4	PO1
		UNIT-V				

9.	a)	Discuss the various challenges faced in the application of analytics in industries?	7 Marks	BL1	CO5	PO1
	b)	Describe the common methods used for classification in deep learning?	7 Marks	BL1	CO5	PO1
(OR)						
10.	a)	Discuss how are the analytics mapped with IIRA architecture?	7 Marks	BL1	CO5	PO1
	b)	Compare the differences between the CNN and RNN.	7 Marks	BL2	CO5	PO1

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	b)	Discuss the essential elements of the Industrial Internet?	7 Marks	BL1	CO1	PO2
(OR)						
2.	a)	What is cybersecurity defined? Discuss the primary constituents of cybersecurity?.	7 Marks	BL2	CO1	PO1
	b)	Briefly explain about Globalization Effects ii) Socioeconomic effects	7 Marks	BL1	CO1	PO1
UNIT-II						
3.	a)	Briefly discuss how are IIRA frameworks classified?	7 Marks	BL2	CO2	PO2
	b)	What is big data? Discuss how is big data categorized? Give some examples of each type	7 Marks	BL2	CO2	PO1
(OR)						
4.	a)	Discuss the necessary reasons for the application of data analytics?	7 Marks	BL2	CO2	PO1
	b)	Discuss in brief the application of fog layer in (a)transportation industry and (b) smart grid	7 Marks	BL2	CO2	PO1
UNIT-III						
5.	a)	Illustrate Briefly about i) Thermal Sensors ii) Optical Sensors	7 Marks	BL1	CO3	PO2
	b)	Discuss briefly about any two types of sensors with neat sketch?	7 Marks	BL1	CO3	PO2
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6.	a)	Describe the various categories of thermal sensors?	7 Marks	BL1	CO3	PO2
	b)	Explain how acoustic sensors convert sound to energy/electrical signals?	7 Marks	BL1	CO3	PO2
UNIT-IV						
7.	a)	Compare between the Profibus and the Interbus.	7 Marks	BL2	CO4	PO1
	b)	Compare the differences between DCS and SCADA?	7 Marks	BL2	CO4	PO1
(OR)						
8.	a)	Compare the IEEE 802.11AH from other wireless standards	7 Marks	BL2	CO4	PO1
	b)	What is Batibus? Discuss how is LoRaWAN different from LoRa?	7 Marks	BL1	CO4	PO1

		UNIT-V				
9.	a)	Discuss the different features of H2O platform.	7 Marks	BL1	CO5	PO1
	b)	Discuss briefly about the advantages of data science in industries?	7 Marks	BL1	CO5	PO1
		(OR)				
10.	a)	Explain the necessary conditions required for the application of analytics in industries.	7 Marks	BL1	CO5	PO1
	b)	Describe the common methods used for classification in deep learning?	7 Marks	BL1	CO5	PO2

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