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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**

Course Code: 24AM7PEIOT **Max Marks: 100**

Course: Internet of Things

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

				CO	PO	Marks
			UNIT - I			
1	a)		Elaborate on Internet of Things (IoT)'s contribution to the process of digitization and explain its genesis.	CO1	PO1	**08**
	b)		Analyse the impact of IoT on businesses and society. Identify the key challenges associated with IoT implementation.	CO2	PO2	**07**
	c)		Describe the key characteristics of Fog Computing.	CO1	PO1	**05**
			OR			
2	a)		Explain the convergence of Information Technology (IT) and Operational Technology (OT). How does this convergence influence the design of IoT network architectures?	CO1	PO1	**08**
	b)		Describe the Core IoT Functional Stack and the IoT Data Management and Compute Stack. How do these components support IoT functionality?	CO2	PO2	**07**
	c)		Provide the key considerations when choosing components for the architecture under oneM2M (one Machine to Machine) architecture.	CO1	PO1	**05**
			UNIT - II			
3	a)		Analyse the design constraints for "Smart Objects" in the context of IoT. Explain their role and significance in enabling IoT applications.	CO2	PO2	**06**
	b)		Differentiate between sensors, actuators, and smart objects. Provide examples to illustrate how they work together in an IoT ecosystem.	CO1	PO2	**08**
	c)		Describe the key characteristics of a "Smart Object".	CO1	PO1	**06**
			OR			

	4	a)	Describe the architecture, key components of Sensor networks and their role in connecting smart objects.	*CO2*	*PO2*	**06**
		b)	Explain the communication criteria and various IoT access technologies used to connect smart objects. How do these technologies impact the performance of IoT systems?	*CO1*	*PO2*	**08**
		c)	Elucidate on High Level Zigbee Protocol Stack.	*CO1*	*PO1*	**06**
			UNIT - III			
	5	a)	Discuss the business case for using IP as the network layer in IoT.	*CO2*	*PO1*	**07**
		b)	Highlight the importance of profiles and compliances in ensuring interoperability and standardization across IoT systems.	*CO2*	*PO1*	**06**
		c)	Identify the key factors to consider IPv4 and IPv6 support in an IoT solution.	*CO2*	*PO2*	**07**
			OR			
	6	a)	Elucidate why optimization is necessary in IoT networks? Explain how IP can be optimized for IoT applications to improve efficiency and scalability?	*CO2*	*PO1*	**07**
		b)	Explain the role of the transport layer in IoT networks. Compare different IoT application transport methods and their suitability for specific use cases.	*CO2*	*PO1*	**06**
		c)	Differentiate between adaptation and adoption with respect to IoT.	*CO2*	*PO2*	**07**
			UNIT - IV			
	7	a)	Propose a data analytics strategy for the below scenario. Use machine learning and edge streaming analytics to analyze the data and provide real-time traffic solutions. "A smart city project aims to use IoT devices to monitor and manage traffic congestion. The system collects large volumes of data from sensors embedded in roads, traffic lights, and vehicles".	CO2	*PO3*	**08**
		b)	Identify the key challenges in securing IoT systems. Compare IT and OT security practices and their implications for IoT security.	*CO3*	*PO1*	**07**
		c)	Evaluate the benefits and trade-offs of using edge streaming analytics verses cloud-based analytics in IoT Systems.	*CO2*	*PO2*	**05**
			OR			
	8	a)	Design a security framework for the company in the given scenario. Apply IT and OT security practices can be integrated and risk analysis structures like OCTAVE to address the security concerns. "A manufacturing company has deployed IoT devices on its factory floor to monitor machinery and optimize operations. The company is concerned about potential cyberattacks on its OT systems".	*CO2*	*PO3*	**08**

		b)	Identify the role of data analytics in IoT. How do machine learning and big data analytics tools enhance the value of IoT systems?	*CO3*	*PO1*	**07**
		c)	"Traditional data analytics solutions are not always adequate." Justify the statement.	*CO2*	*PO2*	**05**
			UNIT - V			
	9	a)	Identify the role of Arduino UNO in IoT projects. Highlight its key features and its facilitations in the development of IoT applications?	*CO3*	*PO2*	**08**
		b)	Elucidate on different time and math functions used in Arduino.	*CO3*	*PO2*	**08**
		c)	Write a note on temperature monitoring system using Pi.	*CO1*	*PO1*	**04**
			OR			
	10	a)	Describe the key components of the RaspberryPi board, such as the CPU, GPIO pins, power supply, and connectivity options. How do these components contribute to the functionality of the RaspberryPi in IoT applications?	*CO3*	*PO2*	**08**
		b)	List and explain the commands of RaspberryPi with suitable example	*CO3*	*PO2*	**08**
		c)	Write a note on hardware layout and operating system in RaspberryPi.	*CO1*	*PO1*	**04**

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