U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**

Branch: CSE(IoT & Cyber security including Blockchain **Duration: 3 hrs.**

Course Code: 23IC4PCIOT **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.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Illustrate the operation of the core IoT functional stack with a real-world example.	*CO1*	*PO1*	**10**
	b)	Summarize the main objectives of oneM2M and IoT World Forum (IoTWF) in the context of IoT architecture development. Draw labeled diagrams to illustrate and compare their architectural approaches.	*CO1*	*PO1*	**10**
		OR			
2	a)	A smart agriculture company is deploying a Wireless Sensor Network (WSN) across vast farmland to monitor soil health, crop growth, and weather patterns. Explain the key design challenges the company will face when deploying the WSN. What strategies can be implemented to address these challenges?	*CO1*	*PO1*	**10**
	b)	Explain how each layer of an IoT system supports efficient traffic management when a smart city deploys sensors to monitor vehicle flow, transmits data to a cloud platform, and sends live updates to traffic control centers. Include a simple architecture diagram to show how the layers interact to enable real-time decision-making and ensure road safety.	*CO1*	*PO1*	**10**
		UNIT - II			
3	a)	Classify the appropriate use cases for each of the UART, SPI, and I2C communication protocols, with examples of devices or systems where each is most suitable.	*CO2*	*PO2*	**10**
	b)	In a smart home project, the Bluetooth communication between sensors and a central hub needs to be reprogrammed.Explain the procedure to enter AT Mode from Data Mode on a Bluetooth	*CO1*	*PO1*	**10**

			module and summarize the importance of AT Mode in modifying connection settings for improved performance.			
			OR			
	4	a)	During the design of a smart city lighting system using ZigBee IP, engineers must understand which protocol layers handle specific functions like data reliability, addressing, and transmission. Classify the responsibilities of each layer in the ZigBee IP stack with diagram, giving examples of what type of task is handled at each level.	*CO2*	*PO2*	**10**
		b)	A logistics company wants to track goods in real time using LoRaWAN, with data sent via MQTT protocol. Interpret with diagram how the application layer protocols are selected and integrated over LoRaWAN to support efficient data transmission for logistics tracking.	*CO2*	*PO2*	**10**
			UNIT - III			
	5	a)	Apply the CoAP to design the application-layer communication in IoT infrastructure for basic message exchange. Briefly outline how CoAP integrates with IP-based networks using 6LoWPAN and supports device interoperability.	*CO3*	*PO3*	**10**
		b)	In the context of constrained network (low-power wireless sensor network) with limited MTU size, analyze how 6LoWPAN handles the transmission of a large IPv6 packet. Illustrate the role of fragmentation using fragmentation header.	*CO2*	*PO2*	**10**
			OR			
	6	a)	Compare the differences between CoAP and MQTT architectures in the context of a smart home system Explain with diagram which protocol is more suitable for real-time control actions (e.g., remotely switching lights on/off) versus periodic data reporting (e.g., room temperature updates), and provide a clear justification for your choice.	*CO2*	*PO2*	**10**
		b)	Implement the device discovery mechanism in the IoTivity framework for an IoT application. Describe the steps involved in the discovery for devices in a smart home network.	*CO1*	*PO1*	**10**
			UNIT - IV			
	7	a)	**Describe** the process of setting up an Amazon EC2 instance, configuring an S3 bucket for file storage, and implementing Auto Scaling for a web-based application. Explain each layer and how these services work together to provide a scalable and resilient infrastructure.	*CO2*	*PO2*	**10**

		b)	Examine how Amazon Kinesis and SQS can be used in combination for stream processing and message queueing in an IoT application.	*CO2*	*PO2*	**10**
			OR			
	8	a)	Judge the effectiveness of using Amazon DynamoDB versus RDS for a real-time data processing system in a social media application with an analysis of benefits and limitations of each service.	*CO2*	*PO2*	**10**
		b)	Determine the key differences between SDN and NFV in terms of their architecture, objectives, and use cases with example.	*CO2*	*PO2*	**10**
			UNIT - V			
	9	a)	Analyze the security risks associated with IoT devices in a smart home environment. Explain the potential vulnerabilities and the security measures that could be implemented to mitigate these risks.	*CO2*	*PO2*	**10**
		b)	Differentiate the key components of an IoT security framework by integrating secure device provisioning, encrypted communication, and access control. Justify how each component contributes to confidentiality, integrity, and availability.	*CO2*	*PO2*	**10**
			OR			
	10	a)	Compare the different IoT security controls available for protecting device security and evaluate the strengths and limitations of each method when applied to critical IoT devices in healthcare.	*CO2*	*PO2*	**10**
		b)	Evaluate the effectiveness of network segmentation and firewalls in protecting IoT devices from external cyber threats. Discuss the role of these practices in ensuring secure communication between devices.	*CO2*	*PO2*	**10**

****