BG/D/TZ

Reg. No:

Final Assessment Test – April 2026

Vellore Institute of Technology

Course: **BCSE310L - IoT Architectures and Protocols**

Class NBR(s): **2061/3469/3471** Slot: **C1+TC1**

Time: **Three Hours** Max. Marks: **100**

- **KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**
- **DON'T WRITE ANYTHING ON THE QUESTION PAPER**

COs	CO Statements
CO1	Identify the hardware and software components, challenges of Internet of Things.
CO2	Assess different Internet of Things technologies and their applications.
CO3	Design basic circuits using sensors interfacing, data conversion process and shield libraries to interface with the real world.
CO4	Build and demonstrate the project successfully by sensor requirements, coding, emulating and testing.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions

(10 X 10 = 100 Marks)

1.	Define the Internet of Things (IoT). Explain the functional blocks of an IoT with a suitable diagram. Also discuss the major challenges and issues involved in implementing IoT systems.	CO1	BL1
2.	Analyse the importance of communication technologies in IoT systems. Compare the wireless technologies and justify which is most suitable for low-power IoT environments.	CO2	BL4
3.	A smart city deployment includes thousands of environmental sensors distributed across the city to monitor parameters such as air quality, traffic density, and noise levels. These sensors operate on low-power wireless networks and must also be connected to the global IPv6-based Internet infrastructure for data transmission and remote monitoring. Explain the role of 6LoWPAN in enabling scalable communication in the IoT environment and discuss how 6LoWPAN supports IPv6 connectivity for constrained devices.	CO2	BL2
4.	A smart supply chain management system is implemented to track goods, monitor storage conditions, and automate logistics operations across warehouses and distribution centres. Elucidate how IoT technologies support this system by: a) Illustrating how RFID technology can be used for tracking and identification of goods. b) Describing how SCADA systems can monitor and control storage conditions and logistics operations. c) Discussing the role of given RFID and SCADA technologies in enhancing efficiency, automation, and real-time monitoring within an IoT-enabled supply chain.	[3+4 +3]	CO2 BL3

5.	A smart healthcare system deploys thousands of IoT devices such as wearable sensors, patient monitoring systems, and medical equipment that continuously generate large volumes of health data. This data must be stored, processed, and analysed efficiently to enable real-time monitoring and timely medical decision-making. Identify the major challenges involved in storing and processing the large volumes of data generated by these IoT devices and mention how cloud computing technologies overcome the challenges through scalable storage, high processing power, and efficient data management in healthcare IoT applications.	CO2	BL4
6.	A pharmaceutical storage unit must maintain medicines at a controlled temperature, as any sudden increase in temperature may damage the medicines and cause financial loss. Design and explain a Temperature Monitoring System using ARDUINO and a temperature sensor (LM35 or DHT11) that continuously monitors the temperature and triggers an alarm when it exceeds a predefined threshold value.	CO3	BL3
7.	A company is developing a new IoT routing protocol for wireless sensor networks. Before implementing it on real hardware, they want to test the protocol in a simulated environment. Explain how the COOJA simulator supports protocol development and testing in IoT networks. Describe how developers can monitor packet flow, network topology, and node communication.	CO3	BL4
8.a)	Explain the working principle of the LOADng routing protocol and discuss how it supports routing in Low-power and Lossy Networks (LLNs).	CO3	BL2
	OR		
8.b)	Discuss the role of Open vSwitch Database Management Protocol (OVSDB) in managing virtual switches in IoT networks. Explain how it supports scalability and centralized network management.	CO3	BL2
9.a)	A smart city air-quality monitoring system deploys multiple sensors across the city to collect environmental data such as pollution levels and send it to a cloud platform for storage and analysis. Analyze how Web of Things (WoT) principles, RESTful APIs based on the Richardson Maturity Model, and cloud-based IoT data management can be used to enable efficient resource identification, seamless sensor-to-cloud communication, and scalable data analytics in this system.	CO3	BL4
	OR		
9.b)	A smart home system includes connected devices such as smart lights, thermostats, security cameras, and motion sensors. These devices communicate with a cloud platform and can be controlled through mobile applications. Analyze how WoT architecture and RESTful APIs can enable interoperability between smart home devices, and discuss the role of cloud-based IoT data management in storing and analyzing usage data.	CO3	BL4

10. A company plans to deploy an IoT-based smart farming system where soil moisture sensors, weather monitoring devices, and automated irrigation systems collect data and send it to a cloud platform to optimize crop yield and resource usage. Farmers can access these services through a subscription-based IoT platform. **CO4** **BL4**

Identify and analyze the most suitable IoT business model for this smart farming system and explain how IoT technologies can support smart farming to:

- Improve crop productivity
- Enable efficient resource management
- Promote agricultural sustainability

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