Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 16 – 12- 2025 **Time:** 01:00pm – 04:00pm

School: SOE	**Program:** B.Tech	
Course Code: ECE3075	**Course Name:** IoT Architecture and Protocols	
Semester: VII	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5	CO5
Marks	14	14	14	24	14	20

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 2marks. **10Q x 2M=20M**

1.	IoT architecture defines how devices, networks, and applications interact. What are the seven components of Internet of Things (IoT)?	**2 Marks**	**L1**	**CO1**
2.	A typical IoT architecture has multiple layers for organized communication. List the scope and challenges of IoT?	**2 Marks**	**L1**	**CO1**
3.	The Perception Layer handles sensing and data collection. Write the types of sensors.	**2 Marks**	**L1**	**CO2**
4.	Sensors and actuators operate in the perception layer. What are the three major layers of IoT?	**2 Marks**	**L1**	**CO2**
5.	RFID tags and readers are also part of this layer. Define Cloud computing.	**2 Marks**	**L1**	**CO3**
6.	The Network Layer transfers data from sensors to servers or cloud. Write any two cloud service providers as examples.	**2 Marks**	**L1**	**CO3**
7.	Network layer uses both wired and wireless technologies. Why IPV6 is preferred than IPV4?	**2 Marks**	**L1**	**CO4**
8.	The Application Layer provides services to end users. What is MQTT?	**2 Marks**	**L1**	**CO4**
9.	Different applications include smart homes, healthcare, and industry. Mention any four applications of Bluetooth.	**2 Marks**	**L1**	**CO5**
10.	Some architectures include a Middleware Layer. What are the network topologies in IoT?	**2 Marks**	**L1**	**CO5**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Middleware ensures device interoperability. Write about the main components of IoT ecosystem and explain how do they work together to enable smart connectivity.	**10 Marks**	**L2**	**CO1**
	b.	IoT uses cloud platforms for storage and analytics. Explain the role of sensors in the IoT and its potential impact on various sectors.	**10 Marks**	**L2**	**CO2**
		Or			
12.	**a.**	Edge computing processes data near the device. Discuss about simplified architecture of IoT with neat diagram.	**10 Marks**	**L2**	**CO1**
	b.	Fog computing enables distributed processing between edge and cloud. Explain actuators and its types.	**10 Marks**	**L2**	**CO2**

13.	**a.**	IoT architecture requires scalability for millions of devices. Explain in detail the prototyping of embedded devices using Arduino.	**10 Marks**	**L2**	**CO3**
	b.	IoT supports heterogeneous devices and communication standards. Explain the steps of IoT design methodology.	**10 Marks**	**L2**	**CO4**
		Or			
14.	**a.**	Security is built into each layer of architecture. Write a short notes on Edge, Fog and Cloud computing.	**10 Marks**	**L2**	**CO3**
	b.	The perception layer requires secure sensing. Explain in detail about cloud service provider.	**10 Marks**	**L2**	**CO4**

15.	**a.**	The network layer requires encryption. Describe the IoT accessing technology- IEEE 802.15.1.	**10 Marks**	**L2**	**CO4**
	b.	The application layer requires authentication and access control. Explain about web socket application.	**10 Marks**	**L2**	**CO5**
		Or			
16.	**a.**	Real-time communication is often needed in IoT systems. Justify in detail why IPV6 is preferred in IoT than IPV4.	**10 Marks**	**L2**	**CO4**
	b.	IoT architecture supports machine-to-machine communication (M2M). Write about Bluetooth technology, its applications and its significance	**10 Marks**	**L2**	**CO5**

17.	**a.**	A small electronics startup is designing a prototype device that requires a simple visual indicator to show that the system is powered and running correctly. The design team has decided to use an Arduino Uno for early development and wants to implement a basic LED blink indicator to test the microcontroller's digital output functionality. As a hardware intern, you have been asked to set up the LED on a breadboard and program the Arduino so that the LED blinks at a fixed interval. The LED should remain ON for one second and OFF for one second, repeatedly. The LED is to be connected to digital pin 13 of the Arduino. Explain the circuit setup required to connect the LED to the Arduino Uno, including the role of any components used.	**20 Marks**	**L3**	**CO6**

		Or			
18.	a.	A research team is developing a wearable electronic assistance device for visually impaired individuals. The goal of the device is to detect nearby obstacles and provide vibration feedback to alert the user. The team decides to use an Ultrasonic Distance Sensor (HC-SR04) along with an Arduino Uno to measure the distance of obstacles in front of the user. The device should work as follows: • The ultrasonic sensor sends out sound pulses and measures the time taken for the echo to return. • The Arduino calculates the distance based on this echo time. • If the obstacle is closer than 40 cm, the device activates a vibration motor to warn the user. Discuss **two practical challenges** the team might face when using ultrasonic sensors for wearable devices, and suggest possible solutions.	**20 Marks**	**L3**	**CO6**