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: ECE3082	**Course Name:** Data Science for IoT	
Semester: VII	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5	CO6
Marks	12	12	12	20	22	22

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.	The four stage IoT architecture consist of sensors, gateways, edge computing, and cloud. **List the stages that represent the Information Technology (IT).**	**2 Marks**	**L2**	**CO1**
2.	State the characteristic of sensor that is the smallest amount of change in the input that can be detected and accurately.	**2 Marks**	**L2**	**CO1**
3.	List the protocols applicable to **application layer** in TCP/IP model	**2 Marks**	**L2**	**CO1**
4.	Identify the communication model in which the data producers push the data to queues and the consumers pull the data from the queues..	**2 Marks**	**L2**	**CO1**
5.	Identify the device that converts physical characteristics into electrical signals.	**2 Marks**	**L2**	**CO1**
6.	State the communication API that follow the exclusive pair communication model and real-time.	**2 Marks**	**L2**	**CO1**
7.	Identify the type of Data that represents information with a clear order or ranking, but the values are not quantifiable.	**2 Marks**	**L2**	**CO2**
8.	Various types of DAQ tools available in the market. **State the difference between Standalone vs. Networked DAQ.**	**2 Marks**	**L2**	**CO3**

9.	State the two wireless connectivity for embedded devices ESP32 chip provides.	**2 Marks**	**L2**	**CO5**
10.	Compute the digital value of ADC in ESP32 if the input voltage is 1.3V.	**2 Marks**	**L2**	**CO6**

Part B

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

11.		The Internet of Things (IoT) is the network of physical objects to collect and exchange data**. Discuss the Criticisms and Controversies of IoT**	**10 Marks**	**L3**	**CO2**
		Or			
12.		An IoT device may consist of several interfaces for connections to other devices. **Describe with diagram the Generic block diagram of an IoT device**.	**10 Marks**	**L3**	**CO2**

13.		The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity**. Discuss any two applications of IoT**	**10 Marks**	**L3**	**CO3**
		Or			
14.		For smart energy application, the system should consist of sensors, actuators, communication, and cloud. IoT World Forum Reference Model enables conceptualization of a framework. Fig 1 illustrates the IoT application in energy**. Decompose the problem and map with IoT World Forum Reference model layers.**	**10 Marks**	**L3**	**CO3**

15.		Various types of Data acquisition (DAQ) tools are available in the market to cater to different needs and preferences**. Discuss the types of DAQ Tools.**	**10 Marks**	**L3**	**CO4**
		Or			
16.		Understanding data categories can help you choose the right analysis techniques. **Discuss the types of data**.	**10 Marks**	**L3**	**CO4**

17.		Hadoop is an open source software programming framework for storing a large amount of data and performing the computation**. Examine with diagram the Hadoop architecture**.	**10 Marks**	**L3**	**CO4**
		Or			
18.		There are three distinct storage formats that allow you to store data. **Examine the types of data storage**.	**10 Marks**	**L3**	**CO4**

19.		An ESP32 is interfaced with 16x2 I2C LCD display. The GPIO 21 and GPIO22 pins of ESP32 support the SDA and SCL signal for I2C respectively. The I2C device address is 0x27. a. Draw the schematic diagram illustrating the interface. (6 marks) b. Write the code to display "Hello World" and clear the LCD every sec. (14 marks)	**20 Marks**	**L4**	**CO5**
		Or			
20.		Design an ESP32 system to control five LEDs each of color red, blue, green, yellow and white interfaced to pins GPIO5, GPIO18, GPIO19, GPIO21 and GPIO23 respectively. Table 1 shows the forward voltages for each color. Table 1 LED color / Forward voltage Red — 1.8 V Yellow — 2.1V Green — 2.2 V Blue — 3.2 V White — 3.2 V a. If the typical current through each LED is limited to 15mA, Compute the value of resistance. (15 marks) b. Draw the schematic diagram illustrating the interface. (5 marks)	**20 Marks**	**L4**	**CO5**

21.		An ESP32 system is used to measure current using ACS712 current sensor. The GPIO34 (ADC6) of ESP32 is connected to the current sensor up to 10A and sensitivity 100mV/Amp. a. Compute the ADC resolution of an ESP32. (4 marks) b. Design for input scaling circuit to reduce input loading. (4 marks) c. Compute the digital value for 1.8A, 2.3A. (4 marks) d. Calculate the current value from the digital values 438, 735 using conversion formula. (4 marks) e. Draw the schematic diagram illustrating the interface. (4 marks)	**20 Marks**	**L4**	**CO6**
		Or			

22.		For a robot arm an ESP32 is interfaced with Servo motor shown in Fig. 2. The GPIO 13 of ESP32 is connected to the signal.  Fig. 2 Servo motor pinout a. Draw the schematic diagram illustrating the interface. (6 marks) b. Write the code to control rotation from 0 deg. to 180 deg. clock wise and anti-clockwise with delay of 20ms/deg. (14 marks)	**20 Marks**	**L4**	**CO6**

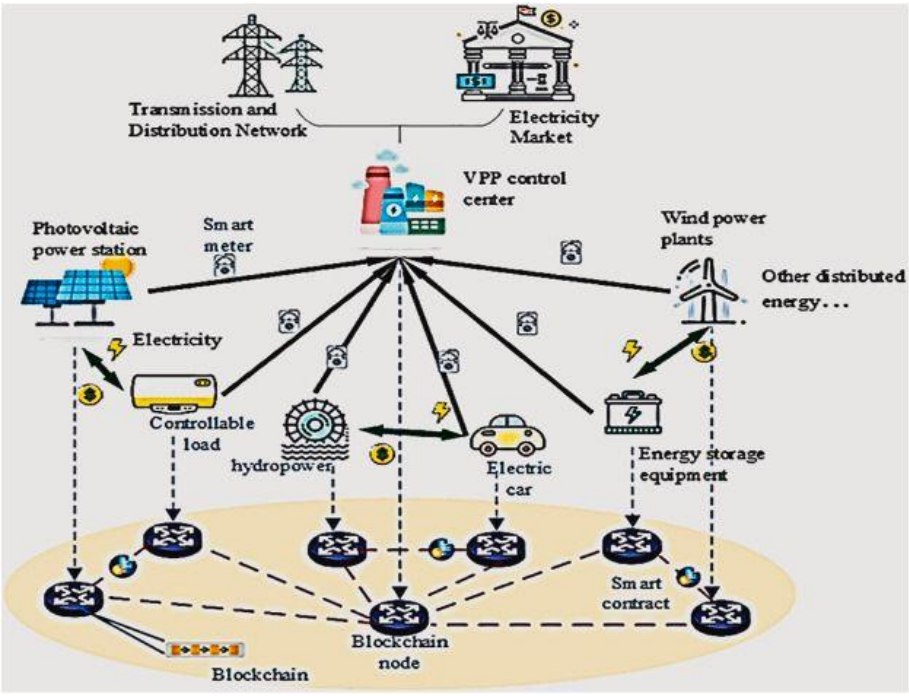

Fig. 1 IoT application in energy