Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Introduction to IoT **Semester: IV**
Program: B. Tech ECE **Time 03 hrs.**
Course Code: CSIS2001 **Max. Marks: 100**

Instructions: Assume any missing data.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
1	Define Embedded Systems. With an example explain why PC (Personal Computer) cannot be used for the design of all types of embedded systems	4	CO3
2	In the Internet of Things (IoT definition), with examples, define i) Thing ii) Identifier	4	CO1
3	In embedded systems, define pipelining and compare it to non-pipeline instruction execution	4	CO3
4	Highlight the differences between sensor, actuator, and transducer. Give example for each	4	CO2
5	Elaborate in brief, i) IoT cloud, ii) Edge computing	4	CO4

SECTION B
(4Qx10M= 40 Marks)

S. No.		Marks	CO
6	Define and explain, with an example, the concept of Hardware-Software co-design in IoT and embedded systems. Enlist the advantages and disadvantages.	10	CO2
7	Enlist the different characteristics of embedded systems (embedded computing applications) with an example for each	10	CO4
8	In embedded systems define and explain the importance of i) Program and Data Memory ii) Von-Neumann and Harvard architecture iii) Volatile and Non-volatile memory	10	CO3
9	What are the different generations of NodeMCU? Briefly explain each along with the name of supported microcontrollers. Differentiate the performance and features between ESP8266 and ESP32 **OR** Define RSSI. Explain the importance of RSSI in IoT. Write a sample code to measure RSSI using ESP8266	10	CO4

SECTION-C (2Qx20M=40 Marks)			
S. No.		**Marks**	**CO**
10	To design an IoT-based Wi-Fi system, ESP8266 should be operated in STA mode and Access Point (AP) mode. Explain in the detail, with figures, the working of ESP8266 in STA and AP mode. Write and elaborate on the necessary commands required to connect ESP8266 to both modes. Consider both wireless and wired internet.	**20**	**CO4**
11	Design an LVDT (Linear Variable Differential Transformer), based displacement measurement system with schematic and output waveforms, for the following conditions. i) If the core of LVDT is centered ii) If the core of LVDT is close to primary winding S1 iii) If the core of LVDT is close to the secondary winding S2 Mentioned the advantages and disadvantages of using LVDT **OR** In the design of an MQTT based publish-subscribe sensor data transfer model to upload the sensor data to the MQTT cloud, explain i) Publish-Subscribe Model ii) Hostname and Port number iii) The topic name for publishing and subscribing iv) Role of MQTT cloud and MQTT box (in PC and Mobile phone) Write the steps to establish a connection between an MQTT app on mobile or PC to the MQTT cloud	**20**	**CO1**