Name: **Enrolment No:**	

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

Course: Microcontroller and Embedded Systems **Semester: V**
Program: B. Tech ECE **Time : 03 hrs.**
Course Code: ECEG3006 **Max. Marks: 100**

Instructions: Attempt all the questions. Assume any missing data.

SECTION A
(5Qx4M=20Marks)

S. No.	Answer all the questions	Marks	CO
1	In LCD, what is the use of CGRAM and DDRAM memories?	**4**	**CO2**
2	Define the following in relation to LPC2148 architecture with example i) IOSET Register ii) IODIR register iii) PINSEL register	**4**	**CO3**
3	Justify, with examples, why can't a personal computer be used for all embedded computing applications	**4**	**CO1**
4	Define pipelining. Highlight the main difference between a 3-stage and a 5-stage pipelining	**4**	**CO2**
5	In RTOS define a task and enlist the different states of a task	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q	Answer all the questions	Marks	CO
6	Differentiate the following with examples i) Volatile vs Non-volatile memories ii) Von-Neumann vs Harvard architecture iii) Program and data memory	**10**	**CO4**
7	Enlist the different types of embedded systems with examples for each	**10**	**CO3**
8	What is scheduling in RTOS? Highlight the important features of different scheduling algorithms in brief	**10**	**CO4**
9	Write a C code to interface DC motor to rotate it in clockwise and counter clockwise direction with LPC2148 ARM microcontroller using L293D. Draw a neat sketch of the complete set-up. **OR**	**10**	**CO2**

	Write a C code to interface DC motor to rotate it in clockwise and counter clockwise direction with ATmega8 microcontroller using L293D. Draw a neat sketch of the complete set-up.		
SECTION-C (2Qx20M=40 Marks)			
Q	Answer all the questions	**Marks**	**CO**
10	Design a real-time notice board system using ARM7 and 16x2 LCD. Display the characters "ECE" in the first row line 4 and "UPES" in second row and line 5. Display of first row should shift to towards left and display of second row should shift towards right continuously. Write the complete C code and its algorithm. Mention the importance of RS and E pins of LCD.	**20**	**CO4**
11	In the design of ATmega8 architecture what are the different clock options available. Highlight each with a neat sketch **OR** In design of real-time embedded systems define and explain the following i) Pull-up and pull down resistors ii) UART communication protocol iii) SPI Communication protocol iv) I2C communication protocol v) ASIC and FPGA	**20**	**CO3**