Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Course:Embedded systems **Semester: VI**
Program: B.Tech ASE(Avionics) **Time : 03 hrs.**
Course Code:ECEG3051 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	For an AVR system of 1 MHz, generate a delay of 2 millisecond	**4**	**CO2**
2	A switch is connected to pin PB0 and an LED to pin PB7 of AVR. Write a program to get the status of SW and send it to the LED	**4**	**CO2**
3	Write a program to subtract 18h from 2917h and store the result in R25 and R24 in AVR.	**4**	**CO2**
4	Distinguish between hard and soft real time systems	**4**	**CO4**
5	Explain the three stage pipeline architecture of ARM processor	**4**	**CO1**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Interface a set of LEDs with ARM 7 processor to blink alternate LED's	**10**	**CO3**
7	A switch(SW) is connected to pin PA7 of AVR microcontroller which is interfaced with a stepper motor.Write a program to monitor the status of SW and perform the following If SW=0, The stepper motor moves clockwise If SW=1, the stepper motor moves counter clock wise	**10**	**CO3**
8	Interface LED with LPC2148(Arm Processor) to count the number of times a switch is pressed and display it through LED's	**10**	**CO3**
9	What is kernel in RTOS? How scheduling of tasks are done by the kernel?	**10**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Design a RTOS comprising of three motors and three switches to perform the following:	**20**	**CO4**

	a) Pressure gage must be checked every 50 milliseconds b) A valve to be opened if the pressure is greater than 100 psi c) Once opened , the valve must be closed after the pressure drops below 90 psi. If the system is connected to network, how will you process the incoming datagrams?		
Q11	a) For an 10-bit ADC, Vref=2.56 V. Calculate the D0-D9 output if the analog input is a) 0.2 V b)0V . How much is the variation between a and b? b) Design an AVR interfacing with DC motor to perform the following:(Switch is connected to Port A (PORTA.7)) i) If switch =0, the DC motor moves with 25 percent duty cycle ii) IF switch =1, the DC motor moves with 50 percent duty cycle. **OR** **a)** Interface a LCD of your choice with ARM 7 procesor to display "INTERLOGICX" centered in the first row of LCD b)Illustrate with example various hard real time systems .	**20**	**CO3**