


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, December 2022			
Course: Embedded systems Program: B.Tech Mechatronics Course Code: ECEG3039		Semester: V Time : 03 hrs. Max. Marks: 100	
Instructions:			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	How do you classify embedded systems based on complexity and performance?	4	CO4
2	What are the major level of abstraction in the design process of embedded system?	4	CO4
3	Write a program to find the greater of the two values 27 and 54 and place it in R20.	4	CO2
4	What are the different processor modes of ARM7 processor?	4	CO1
5	What are the different forms of semaphore? Illustrate with example	4	CO4
SECTION B (4Qx10M= 40 Marks)			
Q 6	Write an AVR C program to toggle all pins of port B continuously by a) using the inverting operator b) using the EX-OR operator. A switch is connected to pin PB0 and an LED to pin PB7. Write a program to get the status of switch and send it to LED.	10	CO2
7	Assume that Port B of AVR is an input port and connected to a temperature sensor. Write a program to read the temperature and test it for the value 75. According to the test results, place the temperature value into the registers indicated by the following: If T=75 then R16=T If T>75 then R17=T If T<75 then R18=T	10	CO3
8	What are the features of ARM7 processor? Explain the architecture of ARM7 processor with the help of a block diagram.	10	CO1
9	What are the differences between process and thread? What is a device driver? What are the advantages and disadvantages of preemptive and nonpreemptive scheduling in real time system?	10	CO4
SECTION-C (2Qx20M=40 Marks)			

Q 10	<p>a)Write a program using ATmega32 to receive bytes of data serially and put them on port B . Set the baud rate at 9600,8bit data and 1 stop bit . use both interrupt and polling method.</p> <p>b)Design an LCD interfacing circuit with Atmega to send command and data . how will you initialize the LCD.</p>	20	CO3/CO 4
Q11	<p>a) Design an interfacing circuit to get data from channel 0 of ADC in Atmega and display the results in port C and port D</p> <p>b) Design an interfacing circuit to interface an unipolar stepper motor with Atmega .The design should include the coding for rotating the stepper motor continuously with 2 degree step angle to make 80 degree move .Use four step sequence.</p> <p>OR</p> <p>Design a RTOS comprising of three motors and three switches to perform the following:</p> <ul style="list-style-type: none"> a) Pressure gage must be checked every 50 milliseconds b) A valve to be opened if the pressure is greater than 100 psi c) A valve to be opened if the pressure is greater than 100 psi. <p>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?</p>	20	CO3/CO 4