

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Embedded Systems
Program: M. Tech A& RE
Course Code: ECEG7003

Semester: I
Time 03 hrs.
Max. Marks: 100

Instructions:

SECTION A

S. No.	Answer all the questions	Marks	CO
1	Explain clearly the function of timers of microcontrollers with respect to embedded systems.	5	CO1
2	The internal processor of LCD takes time to latch and make the necessary adjustments as per the command word. Name and explain the flag that indicates busy status of LCD.	5	
3	In embedded systems, define pipelining and justify the computer/memory architecture that supports pipelining.	5	
4	In RTOS, define a semaphore and explain different types of semaphores	5	

SECTION B

S. No.	Answer all the questions	Marks	CO
5	With respect to ARM7 microcontroller, define and explain the different operating modes. Below given is the status register of ARM7, write the combination of bits for M[0:4] to select the operating modes. <div style="text-align: center; margin: 10px 0;"> <p>The diagram shows a 32-bit status register divided into three sections: Condition Code Flags (bits 31-28), Reserved (bits 27-8), and Control Bits (bits 7-0). The Control Bits section includes flags I, F, T, and Mode bits M4 through M0.</p> </div>	10	
6	What are the different characteristics of embedded systems? Explain each with an example	10	
7	In LPC2148, write the algorithm and C code to interface single seven-segment connected to PORT0. Draw the complete set-up	10	
8	In AVR microcontroller, interface a 16x2 LCD by connecting the data pins of LCD to PORTD and control pins to PORTB. Display "M. Tech A&RE" in the middle of first line of LCD. Write the complete C code along with its algorithm	10	

SECTION-C

S. No.	Answer any two questions	Marks	CO
9	<p>Design a real time operating system which is comprised of three motors and three switches. The switches have two positions ON and OFF.</p> <ul style="list-style-type: none">i) Write a c code to scan the switches 15 times per second and turn the motors on or off appropriately.ii) Consider a pressure gauge, whose pressure has to be checked every 50millisecond. If the pressure is more than 100psi, open a valve to release the pressure and the valve must be closed if the pressure drops below 90psi.iii) Justify the use of datagram function in the set-upiv) How will you divide and assign the priority among task (i), (ii), and (iii)	20	
10	<p>In the design of A to D converter interfacing circuit with AVR consider the following specifications</p> <ul style="list-style-type: none">i) $A_{ref} = V_{cc}$ii) Division factor of pre-scalar = 128 <p>Write the complete code to convert the analog value to its digital equivalent and display the same on LCD. Also explain the registers used.</p>	20	
11	<p>While designing an embedded systems using ARM7 controller, what are the important blocks to be considered from the architecture of ARM7? Explain the function of each block using a neat sketch</p>	20	