Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent Institution of MAHE, Manipal)

## VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

## MAKEUP EXAMINATIONS, DECEMBER 2017

## SUBJECT: EMBEDDED PROCESSOR ARCHITECTURE (ELE 4003]

REVISED CREDIT SYSTEM

Time	e: 3 Hours	Date: 28 December 2017	Max. Marks: 50		
Instructions to Candidates:					
	✤ Answer ALL the questions	S.			
	<ul> <li>Missing data may be suita</li> </ul>	bly assumed.			
1A.	The ARM instructions set d make the ARM instruction s statement.	iffers from the pure RISC definition in seven set suitable for embedded applications. Jus	eral ways that tify the above <b>(05)</b>		
1B.	Discuss the embedded platfo	orm characteristics in brief.	(03)		
1C.	The availability of an embe (MTBF) of the product is 3 days/hours for the product?	edded product is 90%. The Mean Time Be 30 days. What is the Mean Time to Repa	tween Failure air (MTTR) in <b>(02)</b>		
2A.	Explain the MU0 processor processor	with the RTL diagram. What are the limi	tations in this (05)		
2B.	Draw the basic ARM memor performed by the control log	y system and control logic diagram and give gic.	e the functions <b>(03)</b>		
<b>2C</b> .	Write the various types of T	HUMB model branch instructions with the	format. <b>(02)</b>		
3A.	Write the significance of TA With a diagram explain the 7	P controller in the JTAG boundary scan tes ΓΑΡ control state machine.	t architecture. <b>(05)</b>		
3B.	Draw and explain the data-p instruction with auto indexi	ath activity in ARM 3 stage pipeline organiza ng	ation for LOAD (03)		
3C.	Give the guidelines for writi	ing DSP code for the ARM7TDMI	(02)		
4A.	Discuss the various pre-emp ID s P1,P2, P3 with estimate ( 0-highest priority, 3-lowes A new process P4 with esti ready queue after 5 ms of s turnaround time for each pr	otive scheduling algorithms. Three processe d completion time 10,5,7 milliseconds and p at priority) respectively enters the ready qu imated completion time 4 ms with priority start of execution of P1. Calculate the wat rocess and the average waiting time and tur	s with process priorities 1,3,2 leue together . y 0 enters the iting time and maround time		

using pre-emptive shortest remaining time algorithm. Assume all the process contain

only CPU operation and no I/O time are involved.

(05)

**4B.** i) Draw the state diagram for binary semaphore. Write how it is used in wait and signal synchronization. ii) The following program consists of 3 concurrent processes and 3 binary semaphores. The semaphores are initialized as S0=1,S1=0,S2=0. How many times will P0 print '0'?

ProcessP0 while(true) { wait(S0); print'0'; release(S1); release(S2); }	
Process P1 wait(S1); release(S0);	
Process P2 wait(S2); release(S0);	(03)
Elaborate on typical ways to use message queue within the application.	(02)

5A.	Explain the features of ARM cortex M3 processor in detail.	(05)
5B.	Draw the typical AMBA based system. Explain the various terminologies used in the AMBA specifications.	(03)

**5C.** With an example discuss the various ARM processor addressing modes. *(02)* 

**4C.**