Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.Tech. (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2017-18

SUBJECT: EMBEDDED SYSTEMS (BME 4011)

(REVISED CREDIT SYSTEM)

Tuesday, 2nd January 2018, 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 100**

Instructions to Candidates:

1. **Answer all FIVE full questions.**
2. **Draw labeled diagram wherever necessary.**
3. **Assume suitable missing data, if any.**

1.	**(a)**	Explain any four embedded system design metrics.	**4**
	(b)	What are the skills required for designing small scale and medium scale embedded systems?	**6**
	(c)	Draw the structure of EPROM, SRAM and DRAM cells.	**6**
	(d)	How do you map the memory using bank switching? Explain.	**4**
2.	**(a)**	Draw and explain the operation of 3-stage pipe line of the ARM processor during multi-cycle instruction execution.	**6**
	(b)	How do you implement PUSH and POP operations for storing data in the stack in ARM mode of the ARM7 processor? Illustrate each type of stack possible with an example.	**8**
	(c)	Draw the structure of the ARM7 register "CPSR" and explain the significance of the "T" bit.	**6**
3.	**(a)**	List embedded - C storage classes, and mention their scope and life-time.	**6**
	(b)	How do you implement CPSR of the ARM processor in embedded - C using structures? Illustrate.	**6**
	(c)	With reference to the communication protocol - SPI:	**2+4+2**
		(i) Draw the block diagram	
		(ii) Explain the signals involved	
		(iii) And draw the topologies	

4.	**(a)**	Compare the two wireless communication protocols – the Bluetooth and the ZigBee.	**3**
	(b)	Explain the scheduling algorithm that is suitable for Real Time Operating System.	**5**
	(c)	How do you decide whether a set of periodic tasks is schedulable or not? Illustrate with an example.	**12**
5.	**(a)**	Draw and explain the hardware and software architecture of a Handheld Computer.	**8**
	(b)	What is EDLC? What are the main objectives of EDLC?	**6**
	(c)	What are the important factors to be considered by an embedded system designer while optimizing the performance of the system? Explain.	**6**