Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEM M.Tech (BME) DEGREE END SEMESTER EXAMINATIONS APRIL 2018

SUBJECT: EMBEDDED SYSTEMS (BME5235)

(REVISED CREDIT SYSTEM)

Friday, 27th April 2018: 9 A.M to 12 NOON

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

Instructions to Candidates:

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

1. **(a)** What is memory mapping? Explain two widely used memory mapping techniques. **8**

(b) How do you implement a combinational logic using an n-bit ROM? Illustrate with an appropriate example. **6**

(c) Write an embedded-C program to convert a 2-digit packed BCD number into corresponding ASCII codes. Assume that the number is available in the memory of the 8051 system. **6**

2. **(a)** Using embedded-C, how do you implement bit-fields required for an 8-bit status register of a microcontroller? Illustrate with an appropriate example. **6**

(b) You are supplied with the following items: **8**

(i) ARM mbed microcontroller board

(ii) A PC with pre-installed TeraTerm interface

(iii) LM35 sensor

Making use of the above mentioned items, design a digital thermometer to monitor the room temperature, and to display the temperature in the TeraTerm window every 1 sec.

(c) What are the files generated on compiling an embedded-C source program? **2**

(d) What is "embedded system design metric"? List the metrics. **4**

3. **(a)** What are the possible ways of implementing stack in an ARM-7 system? Illustrate each possibility with an example. **10**

	(b)	Compare the ARM and THUMB programmer's models of the ARM-7 processor.	**4**
	(c)	What is a preprocessor? What are the capabilities of a preprocessor? Explain.	**1+5**
4.	**(a)**	How do you test whether a set of periodic tasks is schedulable or not? Illustrate with an example.	**8**
	(b)	What are soft real-time, firm real-time, and hard real-time embedded systems? Explain and write an example on each type of system.	**6**
	(c)	Which serial bus protocol makes use of two wires? Draw its architecture, and explain the signals and messages used by the protocol.	**6**
5.	**(a)**	What are the objectives and different phases of EDLC? Explain.	**3+5**
	(b)	Draw and explain the hardware and the software architectures required for implementing a hand-held computer.	**6**
	(c)	What is priority inversion? Give an example and suggest a solution to handle priority inversion in a Real-Time system.	**6**