Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

MAKEUP EXAMINATIONS, DECEMBER 2018

SUBJECT: EMBEDDED SYSTEMS [ICT 3102]

REVISED CREDIT SYSTEM

23/12/2018

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data, if any, may be suitably assumed.

1A. With a neat diagram, explain how a 4x4 matrix keyboard can be interfaced to microcontroller. Write an embedded C program to display the keycode for a key press on the seven segment display. 5

1B. Write an embedded C program using interrupts to generate a square waveform of frequency 200 kHz on P2.3 using TIMER-1 while simultaneously generating a sine waveform with peak to peak amplitude of 3.3 volts and frequency of 4 KHz at AOUT (P0.26, function-3). (PCLK = 3 MHz) 3

1C. What is double buffering in DAC? How is it accomplished? 2

2A. Define the term "Addressing mode". Explain various addressing modes of ARM microcontroller with suitable examples. 5

2B. What is fully ascending stack? Explain the role of STM and LDMDB instructions in implementing a fully ascending stack with an appropriate example. 3

2C. Bring out the salient features of CISC family of microcontrollers. 2

3A. Write an assembly language program to find the LCM of two unsigned 16-bit binary numbers in the code memory and store the result in the data memory. 5

3B. What is "PWM"? Explain how the intensity of a LED can be controlled using PWM. 3

3C. Differentiate between

i) Burst mode and software mode of ADC

ii) Microprocessor and microcontroller 2

4A. Explain the following ARM instructions with an example for each:

i) ADC ii) MSR iii) BGT iv) ORN v) RSBGT 5

4B. Explain the necessity of following registers in handling the BURST mode of ADC:

i) A/D Control Register

ii) A/D Global Data Register

iii) A/D Interrupt Enable Register 3

4C. How do you configure command mode and data mode of LCD? Explain the various LCD commands. 2

5A. Explain the necessity of following UART registers in serial communication:
i) THR ii) RBR iii) DLL iv) IER v) IIR 5

5B. Explain various SFRs available in ARM microcontroller to configure and handle GPIO interrupts. 3

5C. Explain the role of Nested Vectored Interrupt Controller in interrupt handling. 2