Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. (COMPUTER AND COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: EMBEDDED SYSTEMS DESIGN [ICT 2253]

REVISED CREDIT SYSTEM

25/04/2018

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Explain the following ARM instructions with an example for each:
i) UMLAL ii) RRXS iii) BHS iv) LDRSB v) TST 5

1B. For the circuit of Fig.Q.1B shown below, write an embedded C program using external hardware interrupts (Function-01) to turn ON the LED whenever the switch is pressed and turn OFF the LED whenever the switch is released.

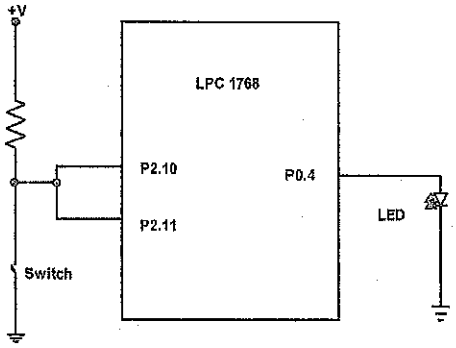

Fig. Q.1B 3

1C. What is the role of Nested Vectored Interrupt Controller in handling the interrupts? 2

2A. Explain the operation of PWM module with a necessary diagram. List and explain the role of various registers associated with PWM 5

2B. Explain with a neat diagram, how the stepper motor is interfaced with ARM microcontroller. Write an embedded C program to rotate the motor 10 steps in the anticlockwise direction. 3

2C. It is required to find the difference in analog voltages applied at ADC channel-0 and channel-1. Explain how this task can be accomplished using BURST mode of ADC. 2

3A. Assume that columns of a 3x3 matrix keyboard are connected to P0.0-P0.2 and rows are connected to P0.3-P0.5, write an embedded C program using GPIO interrupt to display the

key code of the key pressed on a seven segment display. 5

3B. Write an embedded C program to generate a sinusoidal waveform with peak to peak amplitude of 2 volts and frequency of 1 KHz at A_{OUT} (P0.26, function-3). 3

3C. Differentiate between
i) Memory mapped IO and IO mapped IO.
ii) Interrupt and Polling 2

4A. Write an assembly language program to find the LCM of two unsigned 32-bit binary numbers in the code memory and store the result in the data memory. 5

4B. Explain the following addressing modes of ARM microcontroller with an example for each:
i) Post Indexed
ii) Pre Indexed
iii) Pre Indexed with Writeback 3

4C. Bring out the salient features of CISC family of microcontrollers. 2

5A. What is UART? Explain its role in serial communication. Write an embedded C program to transfer the message "Make in India" serially on TxD0 (P0.2, function 2), at 9600 baud. (Assume 1-start bit, 1- stop bit and 8-bit data (PCLK=3 MHz) 5

5B. What is a fully descending stack? Explain the role of STMDB and LDM instructions in implementing a fully descending stack with an appropriate example. 3

5C. How do you configure command mode and data mode of LCD? Explain the various LCD commands. 2