LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



M.Sc. DEGREE EXAMINATION - PHYSICS

SECOND SEMESTER - APRIL 2022

PPH 2501 - EMBEDDED SYSTEMS

Date:	15-06-2022	Dept. No.	Max.: 100 Marks

Time: 09:00 AM - 12:00 NOON

PART - A

Q. No Answer ALL questions $(10 \times 2 = 20 \text{ Marks})$

- 1 State the use of TMOD register in microcontroller 8051.
- Write code to perform multiplication of two numbers by direct addressing mode using microcontroller 8051.
- Write a note on EQU assembler directive in PIC.
- 4 Explain BSF and BCF instructions in PIC.
- 5 Write down the instructions which a) moves 23h into WREG b) adds A8h to WREG in PIC.
- 6 Write a program to toggle bit 2 in Port B continuously in PIC.
- 7 Differentiate MRS and MSR instructions in ARM.
- 8 Explain the role of the "lr" register of ARM7 processors.
- 9 If r1 contains 1, what will be its content after, ADD r1, r1, LSL #3? Explain.
- Write a program to solve, y = a + b c in ARM.

PART – B

Answer any **FOUR** questions

(4x7.5 = 30)

- With an example each, explain the various arithmetic instructions in μ C 8051.
- Develop an ASM program for μ C 8051 to find the largest of a byte array of 20h elements in external Data RAM and store the largest byte in internal RAM location 16h.
- 13 Discuss the different addressing modes in PIC with a program for addition for each mode.
- Write a program to add data stored at 0x10, 0 x11,0 x12 and 0x20,0x21,0x22 respectively and stores the sum at 0x30,0x31,0x32 in PIC.
- 15 Explain the significance of PINSEL registers in ARM.
- Develop a program to find the smallest number in an array of 20 numbers by immediate post indexed mode of addressing in ARM.

PART - C

Answer any **FOUR** questions

 $(4 \times 12.5 = 50)$

- With a neat block diagram of the internal architecture of μ C 8051, explain the role and functioning of the various modules.
- Write a program to generate a square wave with an ON time of 3 ms and OFF time of 10 ms on all pins of Port 0. Given XTAL frequency = 22 MHz.
- 19 a) Write short notes on the branch instructions in PIC.
 - b) Write a program to transfer 41H serially via pin RB1. Put a high at the start and end of data transmission in PIC. (6+6.5)
- Develop a program to generate a square wave of 50 Hz frequency on pin PORTB.7, Use Timer 0, 16 bit mode, prescalar=128 and XTAL frequency = 10 MHz.
- 21 Discuss in detail about exception handling of ARM7 processors.
- Develop assembly language programs in ARM a) to find the square root of a given number b) to solve = $a^2 + b^2 + c!$, using immediate offset mode of addressing. (6+6.5)

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