Question Paper

Exam Date & Time: 26-Jun-2024 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B.TECH. (INFORMATION TECHNOLOGY) DEGREE EXAMINATIONS - JUNE 2024 SUBJECT: ICT 2223/ICT_2223 - EMBEDDED SYSTEMS

Marks: 50

Duration: 180 mins.

Answer all the questions.

1A)	Develop an embedded C program to toggle the LED connected to P0.2 for every 500ms. Also, display the status of a switch connected to P2.12 on the LED connected to P4.2.	(5)
1B)	Write an embedded C program to display a 4 -bit ring counter on a multiplexed seven segment display. Assume the data lines are connected to P0.15 to P0.8 and the decoder lines are connected to P1.3 to P1.0.	(3)
1C)	Explain the following instructions with an example for each. i) BGE ii) BLS	(2)
2A)	Discuss the different modes available to apply external interrupts? Develop an embedded C program to turn ON the LED connected to P0.4 whenever the input at P2.10 (EINT0, function 1) is HIGH and turn OFF the LED if the input at P2.10 is LOW.	(5)
2B)	Develop an embedded C program to generate a triangular waveform at DAC output (P0.26 in function 2) with peak-to-peak voltage of 3.3V.	(3)
2C)	Differentiate between a microcontroller and microprocessor.	(2)
3A)	The analog output of sensor1 is connected to AD0.0(P0.23, Function 1) and the analog output of sensor2 is connected to AD0.2(P0.25, Function1). Write an embedded C program to configure the ADC in software mode and send the digital equivalent of sensor1 analog output at P1.11 to P0.0 if the switch connected to P2.12 is pressed else send digital equivalent of sensor2 analog output to P0.11 to P0.0.	(5)
3B)	Write an assembly language program to convert an 4-digit BCD number available in the data memory into hexadecimal and store result in the data memory.	(3)
3C)	Determine the value at Port 0 after the execution of the following lines of code, considering the data in the following SFR's FIO0SET= 0xA12C FIO0MASK= 0x842 FIO0SET=0X0743	(2)
4A)	Explain Pre indexing and post indexing with the illustration of below code: STR r1,[r0,#4]! STR r1,[r0],#4 STRH r1,[r0,#4] Assume Little Endian r0=0x2000000, r1=0x87654321 Find the memory contents of r0 and r1	(5)
4B)	Develop an embedded program to rotate the stepper motor in 20 steps in the clockwise and anti- Clock direction.	(3)

4C)	Discuss the instructions STM and LDM with a suitable code.	(2)
5A)	Discuss the differences between LSL and LSLS. Assume R0 has 0x0000FF18 and R1 has 0x0000010; what is stored in R0, R1, R2 and R3 along with the flags after the below lines of code Mov R3,#16 LSL R2,R0,R3 LSLS R0,R1,#8	(5)
5B)	Develop the Embedded C code that continuously scans a 3 x 3 matrix keypad for pressed keys and displays the pressed keys on the LCD screen.	(3)
5C)	Discuss in detail about the Special Purpose Registers in ARM architecture	(2)

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