USN

RV COLLEGE OF ENGINEERING
Autonomous Institution affiliated to VTU
IV Semester B.E. Model Question Paper
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Common to CS, CY, CD
IOT AND EMBEDDED COMPUTING
(2022 SCHEME)

Time: 03 Hours   *Maximum Marks: 100*

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, and 9 and 10.

1.1	Indicate the 3 Interrupt Types supported by Arm7 based LPC 2148.	01	2
1.2	What are the different types of communication models used in IoT.	01	2
1.3	List any four most commonly used sensors in IoT and mention any two applications of PWM in IoT	01	3
1.4	Name the functions provided by Arduino IDE for read/write digital pins using ESP32 controller.	01	3
1.5	Name the different Serial communication interfaces provided by Rasberry Pie boards for embedded system development	01	1
1.6	Suggest any one application of Level 6 IOT deployment	01	6
1.7	Calculate the number of steps required to achieve 45 degree rotation for the stepper motor, given step angle = 1.8.	01	3
1.8	Indicate the use of following special function registers: R13, R14, R15.	01	1
1.9	If an instruction takes 3 cycles for execution, then how many cycles are needed for executing4 instructions of the same type in a sequence using a 3-stage pipeline? Assume that there are no interrupts or exceptions while executing them.	02	3
1.10	Given PCLK=15MHz, Required baud rate=9600, Compute the values of DLM:DLL. (Assume DivVal=0, MulVal=1). Show the calculations.	02	3
1.11	Given 1.45V of analog input to AD0.1 input of LPC 2148, what is the digital output generated by the ADC and given digital input of 380 to DACR of LPC 2148, what is the analog output generated by the DAC module of LPC 2148 at the pin AOUT. (assume Vref = 3.3V).	02	3
	Indicate the value to be loaded into match Register MR0, so that timer counter T0TC reaches the MR0 value after 5 milliseconds. Assume the PCLK =		

1.12	10MHz, CCLK=40MHz, T0TC=0. and PR=0. Show the calculation.		02	3	
1.13	Write the suitable seven segment codes for displaying the following: i) for common anode seven segment display, with segment 'a' at LSB and dp at MSB, the code for displaying F ii) for common cathode seven segment display, with segment 'a' at LSB and dp at MSB, the code for displaying 3		02	3	

1.14	Calculate the delay produced by the following program run on LPC2148. Given PCLK = 15MHz. Write the answer in milli-seconds.
	void delay(void)
	{
	T0MCR = 0X04;
	T0TC = 0X00;
	T0MR0 = 75000;
	T0TCR = 0X01;
	while(T0TC != T0MR0);
	T0TCR = 0X02;
	}
			02	3
				
				3	

PART-B

		UNIT-I		06	
2	a	With the neat block diagram of LPC2148, indicate the different peripheral blocks present inside the controller and their application.		10	2
	b	Define embedded system and mention any five characteristics of these systems.		06	2
		UNIT-II			
3	a	Interface 4-digit seven segment display to LPC 2148 Microcontroller with a neat diagram and write an embedded C program to display the string "HELP".		08	3
	b	With the neat diagram explain the interfacing of Stepper Motor to LPC 2148 Microcontroller. Write an embedded C program to rotate the motor by 180 degrees in the clockwise direction when a switch is pressed.		08	3
		OR			
4	a	Describe the Features of LPC 2148 DAC Module with its applications. Write an embedded C program to generate triangular wave using DAC of LPC 2148 Microcontroller.		08	2 3
	b	Explain the working of LPC 2148 ADC Module with its applications. Interface LDR and LED to LPC 2148, and write an embedded C program to read the data from LDR and suitably turn on/off the LED based on the LDR light intensity.		08	3
		UNIT-III			

		UNIT-V		
9	a	Design weather monitoring IOT system, with suitable IOT device and cloud services, with the help of the neat Deployment design of the system. (Make suitable assumptions).	08	3
	b	Design smart parking IOT system, with suitable IOT device and cloud services, with the help of the neat Deployment design of the system. (Make suitable assumptions)	08	3
		OR		
10	a	Discuss the different interfaces provided by the IOT device RasberryPie board and interface one LED and Switch to the board and write a program to blink the led when the switch is pressed.	8 8	3
	b	Discuss any one IOT cloud platform with respect to features and usage (Thingspeak / Blink / Xively / AWS or any other IOT cloud service) with respect to any one use case.		3

Signature of Scrutinizer: Signature of Chairman

Name: Name: