JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 EXAMINATION-OCTOBER-2024

M.Tech-I Semester (ECE)

COURSE CODE (CREDITS): 21M11EC112 (3) MAX. MARKS: 25

COURSE NAME: Embedded Systems and Applications

COURSE INSTRUCTOR: Dr. Pardeep Garg MAX. TIME: 1.5 Hours

Note: *(a) All questions are compulsory. (b) Marks are indicated against each question in square brackets. (c) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.*

Q. No	Question	CO	Marks
Q1(i)	Employing a suitable diagram depicting its architecture, enumerate the basic building blocks of Advanced RISC Machine (ARM) microcontroller.	CO-2	3
Q1(ii)	How does ARM microcontroller utilize Current Program Status Register (CPSR) to monitor and control the internal operations? Discuss in detail along with its 32-bits register indicating the four main fields inside it and their discussion.	CO-2	4
Q2(i)	*It is said that the Barrel Shifter in ARM microcontroller can pre-process one operand in most data processing instructions*. Justify the same by explaining every step involved in the following instruction: ADD R0, R1, R2, LSL#2	CO-2	1.5

Q2(ii)	Which type of branch instruction (conditional or unconditional) is represented by the following lines of ARM processor code; discuss along with the explanation and citing a real-time example of an Embedded system in which this can be implemented:
	MOV r1,#0
	LOOP…
	ADD r1, r1, #1
	CMP r1, #20
	BNE LOOP
		CO-2	1.5

Q3	With the help of architecture of PIC microcontroller (you may consider PIC16F877 family for convenience), discuss the importance of watch dog timer, other important features; and the functioning of all relevant blocks.	CO-2	5
Q4	How many total instructions are there in the PIC microcontroller? What will be the value in W (Working Register) and PORTA after the following sequence of commands? CLRW MOVLW 16 MOVWF PORTA SWAPF PORTA,0	CO-2	3

	SWAPF PORTA,1		
Q5	Draw and discuss the block diagram of embedded system on chip (SoC). Discuss in detail the advantages, disadvantages, and applications of SoC.	CO-3	4
Q6	Embedded system on module (SoM) has offered a lot of advantages which justifies its need; comment on it with proper technical points along with detailed discussion of its wide applications areas.	CO-3	3