VIT®

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test I – January 2023

Programme	:	B.Tech (ECE/ECM)	Semester	:	WS 2022-23
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Class Nbr	:	CH2022235001376
Faculty	:	Dr. SELVENDRAN S & Dr. LUCKY AGARWAL	Slot	:	G1
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		Write the advantages of 8086 microprocessor as compared to 8085 and draw the pin-diagram of 8086 in maximum mode. Differentiate the functionalities of maximum and minimum mode of 8086.	10

2.		Describe the following program. Also, denote the addressing mode and type of instruction of each line.
		MOV SI, 2000H
		MOV CX, [SI]
		MOV AX, 0000 H
		ABC: INC SI
		INC SI
		ADD AX, [SI]
		LOOP ABC
		MOV [3000H], AX
		HLT/ INT3
			10

3.		a) Draw and discuss the flag register of microprocessor 8086. Also, mention the flags' values for the addition of AL and BL register values, 23 h and FA h, respectively. b) Write the output of the following instructions, with appropriate explanation/ illustration, given the register contents as below: AX=4765H; BX=8934H; CX=3104H; DX=8220H; CF=1 • ADC BX,CX • RCL AX, 02H • XCHG BX, CX • MUL BX	(5+5)

		• ROL AX, 02H	
4.		Consider a block of 256 bytes of data is stored in the memory location from address 2000: 1000h. Write assembly language program to arrange this block in reverse order from 2000:3800h.	10
5.		a) A bank of sensors is connected with port B of IC 8255 which is interfaced with 8086. Relay switches are connected with Port A of IC 8255. Both sensor and relay circuits are enabled by setting the port pins PC3 and PC7 of Port C to "1", respectively. Write an Assembly Language Program to switch the relays through sensors. Consider port A and Port B in I/O mode 0 operation and Port A address is 90h. b) Discuss the function of 8255 IC, if the control word loaded as A3 H.	(7+3)

Course Faculty

⇔⇔⇔

Reg. No.: 21BPS1364

Name : Mubin Chinchasalkar

VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test I – January 2023

Programme	:	B.Tech. (CSE) & B.Tech. CSE with Specialization)	Semester	:	WS 2022-23
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Class Nbr	:	CH2022235002461
Faculty	:	Dr. Ravi Tiwari	Slot	:	F2 + TF2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		Differentiate the 8-bit microprocessor and 16-bit microprocessor with respect to architecture, memory segmentation, and types of flags.	[5]
2.		Draw and illustrate the significance of each flag bit in 8086 flag register.	[5]
3.		Discuss any five addressing modes of 8086. Also, give two examples for each.	[10]
4.		Let the registers in 8086 be SS = ABCDH, BP = 2345H, SP = 7456H, AX = 0509H and BX = BC02H, CS = 6500H, DS = 9876H, SI = 1000H, IP = 1200H, ES = 1234H. Write the contents of BX, AX, CX, and SP in the given table after the execution of each instruction.	[10]

Instruction	BX	AX	CX	SP
PUSH BX				
POP CX				
SAR AL,CL				
XCHG AX, BX				
AND BL,F0H				

5.		Write an 8086 assembly language program to compute the number of working days and average working hours in January 2023. The first day of the month is Sunday. Assume the number of working hours is 8 per working day and the number of holidays is 3. The working days could be calculated as below: Number of working days in a month = Number of days in a month – (Number of Saturdays + Number of Sundays + Number of Holidays).	[10]
6.		Assume that you are going to interface 8255 programmable peripheral interface with 8086 microprocessor present in a car. The 8255 is configured as: PORT A as Input, PORT B and PORT C as Output. The seat belt sensor in the car is connected to the port pin 3 of PORT A (PA3) and the alarm is connected to the port pin 2 of PORT B (PB2). Draw the interfacing diagram with all necessary pin connections and write an 8086 assembly language program to check the driver is wearing the seat belt or not, if not, give an alarm signal.	[10]

⇔⇔⇔

VIT

Reg. No. : 21BLC1488

Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	B.Tech	Semester	Winter Semester 2022-23
Course Title	MICROPROCESSORS AND MICROCONTROLLERS	Course Code	BECE204L
Faculty Name	Prof. Guga Priya G	Slot	A2+TA2
		Class Nbr	CH2022235001117
Time	3 Hours	Max. Marks	100

SECTION -A (2 X 5 Marks)
Answer All questions

01. Draw a block diagram for the following tasks to be carried out by a Microprocessor with necessary components, and briefly describe the block diagram. [5]
    a) Count the number of persons entering an elevator (lift) using IR sensor for 15s and display on LCD
    b) Maximum number of persons allowed in the elevator is stored in a RAM location.
    c) When count exceeds, the elevator produces an alarm through a speaker
02. Write an ARM assembly language program to perform the addition of two 64-bit numbers.Assume your own data. [5]

SECTION-B (6 X 10 Marks)
Answer All questions

03. With a neat block diagram, explain the internal architecture of 8086 microprocessor in detail. [10]
04. Write an 8086 assembly language program to find the average of ten 8-bit numbers stored starting from the memory location 2000H. Store the result in 2500H.Assume the result is less than FFH. [10]
05. Write an 8051 assembly language program to convert the given temperature 25°C in Celsius(C) to Fahrenheit (F) scale using the formula F=(9C/5)+32 .Assume the result is not exceeding FFH. [10]
06. With a neat diagram, briefly explain the Memory organization of 8051. [10]
07. With a neat sketch, discuss the ARM architecture in detail. [10]
08. Write the values stored in the registers after executing the following instructions. Assume R1= 0X00000030, R2=0X00002020. [10]
    a) MOV R0, R2, LSR #2
    b) EOR R0,R1,R2
    c) RSB R0,R1,R2
    d) BIC R0,R1,R2
    e) MVN R0, 0x0000FFFF

SECTION-C (2 X 15 Marks)
Answer All questions

09. a). Generate a square waveform with T_{on}=6ms and T_{off}=4ms on port pin P1.0 using timer 0 in mode1. Assume the crystal frequency as 11.0592MHz[8 Marks] [15]
    b). Write an 8051 program to receive bytes of data serially at a baud rate of 9600 and send them through port 2.[7 Marks]

10. a). An 8-bit ADC is interfaced with 8051 microcontroller. The data lines of ADC (D0-D7) is connected to port 1 of 8051, and the RD, WR and INTR pin of ADC is connected to P2.5, P2.6 and P2.7 respectively. Write a program to monitor the INTR pin and bring an converted digital output from port 1 into register A. Also draw schematic diagram for the above configuration.[7 marks] [15]

b). Write an 8051 assembly language program to generate a triangular waveform and saw-tooth waveform using DAC where 8051 is interfaced with DAC through P1.[8 Marks]

Reg. No.: 21BM1031

Name :

VIT

Vellore Institute of Technology

Continuous Assessment Test I – September 2023

Programme	: B.Tech (BCE/BPS/BAI/BRS)	Semester	:	FS 2023-24
		Code	:	BECE204L
Course	: Microprocessors and Microcontrollers	Class Nbr	:	CH2023240101166 CH2023240101169 CH2023240101178 CH2023240100941 CH2023240100943 CH2023240100947 CH2023240100951 CH2023240100954 CH2023240100959 CH2023240100963
Faculty	: REVATHI S, SUBHASHINI N, MUTHULAKSHMI S, MANOJ KUMAR R, BALA MURUGAN M S, SOURABH PAUL, S SELVENDRAN, LAKSHMI PRIYA, AUGUSTA SOPHY BEULET P, SIVASUBRAMANIAN A	Slot	:	E1+TE1
Time	: 90 Minutes	Max. Marks	:	50

Answer ALL the questions

Note: All the programs should have the comments which describes the logic of the program

Q.No.	Sub. Sec.	Questions	Marks
1.		Compare 8085 processor with 8086 processor.	5
2.		The various registers in 8086 microprocessor contain the value as given in Table 1.	10

Table 1

CS : 2000H	DS: 3000H	ES: 3500H	SS: 2500H
DI: 4000H	BP: 4C50H	BX:34FE	IP:2345H
SI: 1000H	SP: 1550H	DX: 13F2H	

Fill column 3 and column 4 of Table 2 for the instruction given in column 2 of Table 2. (Note: Detailed calculation of physical address is expected in answer sheet, final answer to be written in column 4).

Table 2

S. No	Instruction	Addressing Mode	Physical Address

1.	CLC		
2.	MUL [DX]		
3.	MOV AL, [BX+80H]		
4.	MOV AL, [BP+70H]		
5.	MOV AL, 56H		

3. Ten 8-bit hexadecimal numbers are stored in memory locations starting from 2000H to 2009H. Write an 8086 assembly language program to perform the following equation for stored ten numbers. **10**

$$N = \frac{(Sum\ of\ odd\ numbers - sum\ of\ even\ numbers)}{(number\ of\ odd\ number - number\ of\ even\ number)}$$

Store the 'N' value in location 200AH.

4. a. Mention the interface used for connecting input/output device to 8086 microprocessor. **(1 mark)**

b. Explain the various modes of operation in detail of the interface you identified in part (a). **(5 marks)** **10**

c. Write the control word format of the interface you identified in part (a), to connect 3 devices given (i) transceiver (that can both transmit and receive simultaneously), (ii) LCD & (iii) 2 LEDs. Explain the same. **(4 marks)**

5. Explain the function of the following pins of 8051 **5**

(i) $\overline{EA}$

(ii) $\overline{PSEN}$

(iii) ALE

(iv) P0.0-P0.7

(v) P3.2($\overline{INT0}$)

6. Write the results after execution of each instruction in the following program **10**

```
ORG 0000H
MOV B,#23H
MOV R1,#7EH
MOV 0E0H, 01H
SETB PSW.7
RLC A
CPL A
ANL A,B
XCH A,B
MUL AB
MOV 25H, R1
MOV @R1,A
END
```

⇔⇔⇔

Reg. No.: 22BCE1351

Name :

VIT

Vellore Institute of Technology

Continuous Assessment Test I – September 2023

Programme	:	B.Tech. (CSE) & B.Tech. CSE (AI &ML,CPS,AIR)	Semester	:	FS 2023-24
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Class Nbr	:	CH2023240100980
Faculty	:	Dr. S. SELVENDRAN	Slot	:	E2+TE2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		Differentiate the microprocessor and microcontroller with respect to architecture, memory, and types of flags.	5
2.		Describe and explain the architecture of interfacing module with 8086, which is used for timing and control applications.	10
3.		If CS = 1000 H, DS = 25A0 H, SS = 3210 H, ES = 5890 H, BX = 43A9 H, BP = 3400 H, SP = 500H; SI = 0040 H, DI = 0050 H, find the physical address for the following instructions and identify the type of addressing mode used in each instruction. i. ADD BL, 05H[BP][SI] ii. MOV 10H[DI], BX	5
4.		With respect to 8086, explain the following. (i) NMI (ii) INTR (iii) ALE (iv) $\overline{BHE}$ (v) MN/$\overline{MX}$	5
5.		Consider two arrays [2, 56, 76, 77, 31] and [22, 27, 12, 14,17] stored at memory locations starting from 3000H and 4000H respectively. Write 8086 ALP to perform element wise addition in the given array of numbers and store at memory location starting from 1000H. Check the count of even numbers in the resultant array stored at 1000H and store the count in memory location 2000H.	10
6.		Identify the addressing modes for the following 8051 instructions: (i) PUSH A (ii) MOV A, R1 (iii) MOV 55H, @R0 (iv) ADD A, #66H (v) MOVC A, @PC + A	5

7. Analyse the following code and perform the following:

(i) Describe the logic of the program

(ii) What will be the value stored at 60H after complete execution of the program?

(iii) Mention the values stored in each register in the program after every iteration.

Assume 8051 Microcontroller's RAM memory locations 51H to 55H stored with values 33H, 11H, 44H, 11H and 22H respectively.

```
MOV R0,#51H
CLR C
MOV R2,#04H
MOV A,@R0
MOV B,A
UP: INC R0
MOV A,@R0
CJNE A,B,DOWN
SJMP NEXT
DOWN: JNC NEXT
MOV B,A
NEXT: DJNZ R2,UP
MOV 60H,B
END
```

10

@ → Indirect

→ Indirect

⇔⇔⇔