Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala

Department of Computer Science and Engineering

Make-Up EXAMINATION

B. E. (Third Year): Semester-VI (2022/23) (COE)	Course Code: UCS617 Course Name: Microprocessor Based Systems Design
Date: April 18, 2023	Time: 5:30 PM – 7:30 PM
Duration: 2 Hours, M. Marks: 25	Name of Faculty: ANJ, MJU, ROS, AAS

Note: **Attempt all questions** ***in a proper sequence with justification.***
Assume missing data, if any, suitably.

Q1 (6)

Consider the following assembly language program run on an 8085 microprocessor where the content and data are in hexadecimal form.

S. No.	Memory Address	Instruction
1.	2000H	LXI SP, 2100H
2.	2003H	LXI B, 0000H
3.	2006H	PUSH B
4.	2007H	POP PSW
5.	2008H	LXI H, 200BH
6.	200BH	CALL 2064H
7.	200EH	OUT 01H
8.	2010H	HLT
9.	2064H	**DELAY**: PUSH H
10.	2065H	PUSH B
11.	2066H	LXI B, 80FFH
12.	2069H	**LOOP:** DCX B
13.	206AH	MOV A, B
14.	206BH	ORA C
15.	206CH	JNZ LOOP
16.	206FH	POP B
17.	2070H	RET

Answer the following questions with a suitable diagrammatic representation of the content inside registers and memory locations:

a. What is the status of the flag and content of the accumulator after the execution of POP instruction located at 2007H?
b. Specify the stack location and their content after the execution of CALL instruction (not CALL subroutine).
c. What are the contents of the stack pointer register and the program counter after the execution of CALL instruction?
d. Specify the memory location where the program returns after the subroutine.
e. What is the output of this program?

Q2 (2+2+2 =6)

(a) Identify the register content (Accumulator) and the flag register as the following instructions are being executed.
MCI A, C5H
ORA A
RAL
RRC

(b) Consider the data 74H is stored inside the accumulator. Write an assembly language program to flip the content of the accumulator and store the data as 47H.

(c) Write an assembly language program to send 1 on SOD and mask RST 6.5 and RST 5.5.

Q3.	(a) Calculate the delay in the following loops. Assume the clock frequency is 3MHz
	DELAY: LXI B, 45H
	BACK: DCX B
	MOV A,B
	ORA C
	JNZ BACK
	RET
	
	(b) The value of DS register is 3032H and the BX register contains a 16-bit value which is equal to 305AH. After that 000EH is added to BX register (ADD BX, 000EH). The register AX contains some value that needs to be stored at a location as follow:
	MOV [BX], AX
	Calculate the physical address at which the value of AX will be stored?
		4+3 = 7

Q4.	Design the timing Diagram for the instruction **PUSH B** instruction, Where **LXI B, 7800H** and the address of PUSH B is 8000H, value of SP contains 8400H . Assume any missing data if required.	**6**

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END SEMESTER EXAMINATION

B. E. (Third Year): Semester-VI (2022/23) (COE)	Course Code: UCS617 Course Name: Microprocessor-Based Systems Design
Date: May 23, 2023	Time: 2:00 PM – 5:00 PM
Duration: 3 Hours, M. Marks: 45	Name of Faculty: ANJ, MJU, AAS, ROS

Note: Attempt all questions with proper justification.
Assume missing data, if any, suitably.

Q1(a) Write the name of pending interrupts that need to be handled after taking the contents of the Accumulator shown below: (3)

```
EI
MVI A, 3C H
RIM
```

Q1(b) Differentiate between the core i7 processor and core i9 processor using the number of cores, and memory size. (2)

Q1(c) The following instructions have been executed by an 8085 microprocessor: (5)

Address	Instruction
8010H	LXI H, 798AH
8013H	MOV A, L
8015H	SUB H
8016H	ADD L
8017H	DAA
8018H	MOV H, A
8019H	PCHL

Write the contents of the H register, L register, Accumulator, and PC at the end of each instruction.

Q2(a) (6)

i.	ii.	iii.	iv.

STC
MOV AL, 8CH
RCL AL, 1
	MOV AX, 00H
	MOV AL, -9
	CBW
		STC
		MOV AL, 9
		SBB AL, 4
			MOV AX, 0904H
			AAD

What would be stored in AX register and write the names of the flags which would be affected?

Q2(b) Write a program to transfer the following string "THIS IS THE END SEM" from a variable MIDSEM to the other variable ENDSEM in 8086. Assume that each string element occupies 1 byte of memory. For defining MIDSEM, declare an uninitialized memory of appropriate size. For defining ENDSEM, declare a memory having the same size as the given string. You must have properly commented on the code at each step and use assembler directives to indicate the start and end of the code. (6)

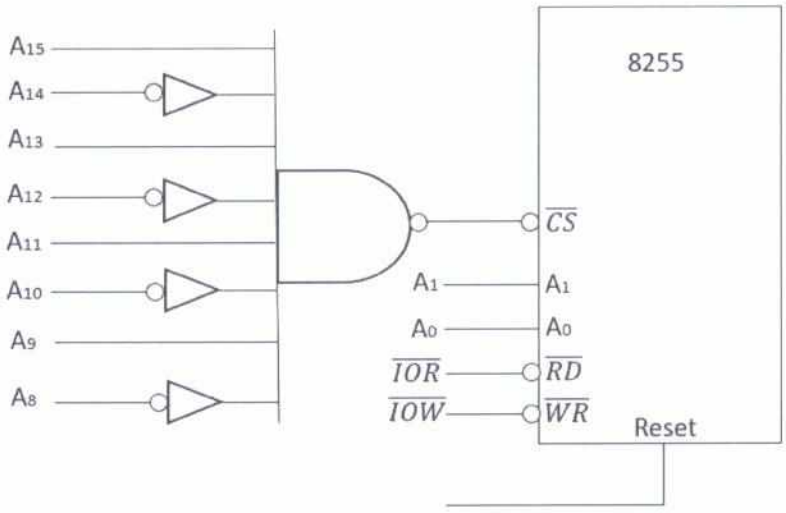
Q3(a) Define XLAT instruction. Explain how the XLAT instruction transforms the contents of the AL register if the initial content inside the AL = 05H, BX = 0400H, and DS = 10EBH. (3)

Q3(b) Write the correct instruction to perform each of the below-given tasks: (5)

i. Shift DI right three places.
ii. Move all bits in AL left in one place.
iii. Rotate all the bits of AL left in three places.
iv. Rotate carry right one place through AX.
v. Move the DH register right to one place.

Consider the following data in the register and also write the output corresponding to each instruction. DI = E5H, AL = B2H, AX =98B2H, and DH = 78H.

Q3(c) Discuss dedicated interrupts along with their vectored address and their address range using an Interrupt vector table (IVT) of 8086 with a memory size of 1KB. (4)

Q4(a)	i. Identify the port addresses and address of the control register and assume address lines that are not mentioned in the below-given figure as zero. ii. Write an assembly language sequence to configure Port B and Port C upper as input ports in mode 0.  	(7)
Q4(b)	How data can be transmitted through interfacing 8251 (USART) with 8086 microprocessor using the block diagram of Transmitter Section.	(4)