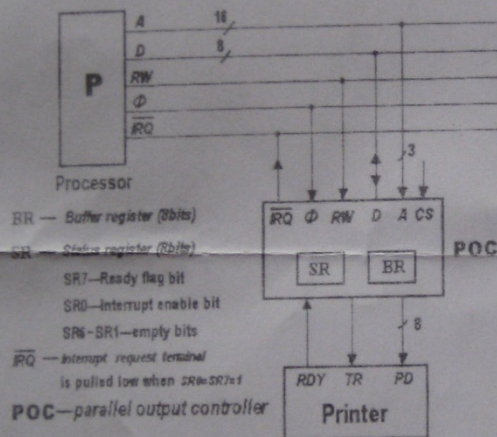课程名称 Computer organization and architecture 考试学期 09-10-3 得分 _____

适用专业 信息科学与工程学院 考试形式 ____闭卷____ 考试时间长度 60分钟

1、According to the experiment---" A Parallel Output Controller". Answer the following questions in English or Chinese：(20 points)

Processor

BR — Buffer register (8bits)

SR — Status register (8bits)

SR7—Ready flag bit

SR0—Interrupt enable bit

SR6~SR1—empty bits

$\overline{IRQ}$ — Interrupt request terminal is pulled low when SR0=SR7=1

POC—parallel output controller

① Describe how the inquiry mode of the system works. The following points should be included: (1) The interface and behavior between Processor and POC, including RW, D, A and CS. (2) the interface and behavior between POC and Printer, including RDY, TR and PD. (3) the register status and changes of POC during the whole communication process. (10 points).

② Describe how the interrupt mode of the system works. The following points should be included: (1) The interface and behavior between Processor and POC, including $\overline{IRQ}$, RW, D, A and CS. (2) the interface and behavior between POC and Printer, including RDY, TR and PD. (3) the register status and changes of POC during the whole communication process. (10 points).

2、According to the experiment —"The Microprogrammed Control Unit" ,Please answer the following questions: (30 points)

①In this experiment, which micro instruction is/are direct addressing mode? which is/are immediate addressing mode? Choose it / them from the following instructions: STORE,LOAD,ADD,SUB,JMPGEZ,MPY, JMP, AND, OR, NOT. Then please answer: what is direct addressing and what is immediate addressing? （3 points）

②Assuming the opcode of the STORE instruction is $(00000001)_2$,the LOAD instruction is $(00000010)_2$,the ADD instruction is $(00000011)_2$, the SUB instruction is $(00000100)_2$, the JMPGEZ instruction is $(00000101)_2$,the HALT instruction is $(00000110)_2$. Read the following table, when the program finished, what is the content in the address 08H ? （5 points）

ADDRESS （HEX）	CONTENT （HEX）
00	0209
01	040A
02	0504
03	0307
04	0408
05	0108
06	0600
07	1111
08	2222
09	4852
0A	3e10

③In this experiment, what is the main difference on design purpose between the control memory and RAM （5 points）

④According to the format of the control flowchart of the LOAD instruction, please describe the control flowchart of the Store instruction. (7 points)
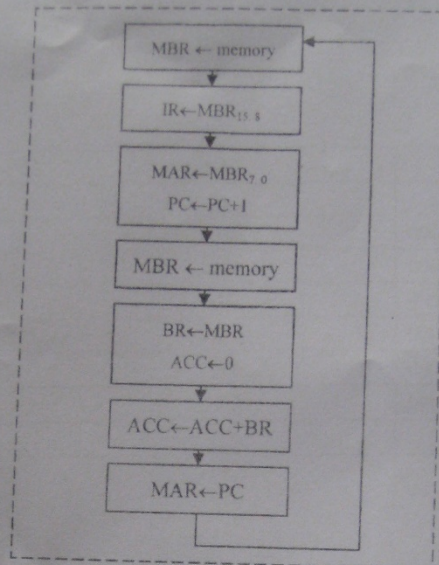
Figure The Control Flow Chart of the LOAD instruction

⑤According to the following table, please write the program for calculating "1+ 2+4+6+…+98", with the similar form. (10 points)

Table 1 Example of a program to sum from 1 to 100

Program with C	Program with instructions	Contents of Memory (RAM) in HEX	
		Address	Contents
sum=0;	LOAD A0	00	02A0
	STORE A4	01	01A4
temp=100;	LOAD A2	02	02A2
	STORE A3	03	01A3
loop :sum=sum+temp;	LOOP:LOAD A4	04 (so LOOP=04)	02A4
	ADD A3	05	03A3
	STORE A4	06	01A4
temp=temp-1;	LOAD A3	07	02A3
	SUB A1	08	04A1
	STORE A3	09	01A3
if temp>=0 goto loop;	JMPGEZ LOOP	0A	0504
end	HALT	0B	HALT