

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14CS2045 System Software**

**Set A**

**Time : 3 hrs**  
**Total Marks: 100**

1. A. Write the sequence of instructions in SIC/XE to perform ALPHA+INCR-1 in BETA and GAMMA+INCR-1 in DELTA. (6)  
B. Explain the architecture of SIC/XE machine in detail. (14)
- OR**
2. A. Describe the following for Cray T3 machine architecture. (14)
  - a. Memory
  - b. Registers
  - c. Data formats
  - d. Instruction formats
  - e. Addressing modes
  - f. Instruction set and Input/output.B. Discuss the differences between CISC and RISC architecture. (6)
3. Translate the following assembly program to SIC object program. The output object program contains H record, T record, and E record. (20)

SAMPLE	START	1000
	LDA	ALPHA
	ADD	INCR
	SUB	ONE
	STA	BETA
	LDA	GAMMA
	ADD	INCR
	SUB	ONE
	STA	DELTA
ONE	WORD	1
ALPHA	RESW	1
BETA	RESW	1
GAMMA	RESW	1
DELTA	RESW	1
INCR	RESW	1
	END	1

**OPCODE TABLE**

LDA	00
ADD	18

SUB 1C

STA 0C

**OR**

4. A. Write the format for modification record. (3)

B. Explain the following machine independent features of an assembler with an example.

- a. Literals (3)
- b. Program Blocks (7)
- c. Control Sections (7)

5. A. Discuss the working principle for bootstrap loader. (10)

B. Write the algorithm for an absolute loader. Mention the advantage and disadvantage of an absolute loader?. If absolute loader is used to load the following object program depict how this program would be loaded in memory? (10)

H<sup>^</sup>ALPHA<sup>^</sup>001000<sup>^</sup>000019

T<sup>^</sup>001000<sup>^</sup>13<sup>^</sup>010003<sup>^</sup>132010<sup>^</sup>050000<sup>^</sup>6F1000<sup>^</sup>169001<sup>^</sup>0F9000<sup>^</sup>13

E<sup>^</sup>001000

**OR**

6. Describe the following:

- a. Comparison between linking loader and linkage editor. (5)
- b. Dynamic Linking. (15)

7. Write short notes on:

- a. Concatenation of Macro parameters. (5)
- b. Expand the following macro invocation statements, using the macro definition given below. (15)

RDBUFF F3, BUF, LEN, (01, 04, 09)  
RDBUFF F1, BUFFER, LENGTH

```
RDBUFF  MACRO  &INDEV,&BUFADR,&RECLTH,&EOR
&EORCT  SET    %NITEMS (&EOR)
        CLEAR  X
        CLEAR  A
        +LDT   #4096
SLOOP   TD     =X'&INDEV'
        JEQ    SLOOP
        RD     =X'&INDEV'
&CTR    SET    1
        WHILE  (&CTR LE &EORCT)
        COMP   -X'0000&EOR (&CTR)
        JEQ    SEXIT
&CTR    SET    &CTR+1
        ENDW
        STCH   &BUFADR, X
        TXR    T
        JLT    SLOOP
SEXIT   STX    &RECLTH
        MEND
```

**OR**

8. Explain in detail the data structure and algorithm of an one pass macro processor that can switch between definition and expansion. (20)

9. A. With a neat diagram, explain the working of an Editor structure. (10)

B. Explain about the Interactive debugging system functions with its capabilities. (10)

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**Wishing you All the Best**

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