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Roll No.

TCS-501

B. TECH. (ME)

**(FIFTH SEMESTER) END SEMESTER
EXAMINATION, Jan., 2023**

SYSTEM SOFTWARE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among
(a), (b) and (c) in each main question.

(iii) Total marks in each main question are
twenty.

(iv) Each sub-question carries 10 marks.

1. (a) Compare and contrast the SIC machine
architecture and SIC/XE machine
architecture with *one* example of each
method. (CO1)

(b) Suppose that ALPHA is an array of
200 words. Write the sequence of

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instructions for SIC/XE to set all 200 elements of the array to 0. Use immediate addressing and register to register instruction to make the process as efficient as possible ? (CO1)

(c) Consider the following : (CO1)

(B) = 006000

(PC) = 003000

(X)=000090 (these are given in Hexadecimal)

Consider the following address and their memory content :

ADDRESS	MEMORY CONTENT
3030	003600
.	.
.	.
3600	103000
.	.
.	.
6390	00C303
.	.
.	.
C303	003030

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Find out displacement/address, Target Address and the value loaded into accumulator for 032600,03 C300, 022030,010030,0310C303.

2. (a) Apply the pass 1 and pass 2 assembler algorithm to assemble the following SIC source program : (CO2)

SUM	START	4000
FIRST	LDX	ZERO
	LDA	ZERO
LOOP	ADD	TABLE,X
	TIX	COUNT
	JLT	LOOP
	STA	TOTAL
	RSUB	
TABLE	RESW	2000
COUNT	RESW	1
ZERO	WORD	0
TOTAL	RESW	1
	END	FIRST

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- (b) Discuss problem associated with one pass assembler. Write the methods to overcome of this problem. Explain all the process with necessary steps ? (CO2)
- (c) Write and implement all the machine independent assembler's methods with necessary steps and figure ? (CO2)
- 3. (a) Define relative loader. How relative loader method used in relocation and program linking. Explain all the methods with example ? (CO3)
- (b) Discuss the text editor with user interface. What is editor structure that makes this more efficient ? (CO3)
- (c) How various Loading option are used by loader for designing purpose ? Discuss various methods associated with this with example. (CO3)
- 4. (a) Write an algorithm for two pass macro processor in which all macro definitions are processed in the first pass, and all macro invocations are expanded in second pass. You do not need to allow for macro definitions or invocations within macros. (CO4)

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- (b) How nested macro invocations are used in macro processor. Write all the necessary steps to design and calculate recursive macro expansion. (CO4)
- (c) Define machine independent macro processor methods with the following : (CO4)
 - (i) Concatenation of macro parameters
 - (ii) Generation of unique labels
 - (iii) Conditional Macro Expansion
 - (iv) Keyword Parameters
- 5. (a) Define Lex with their syntax. Write a Lex Program to count the total number words. (CO5)
- (b) Discuss symbol table used in Lex. How parser communicate with Lex ? (CO5)
- (c) Discuss shift reduce parser with example. Define ambiguity using YACC. (CO5)

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