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10CS52

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021

## System Software

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Briefly describe the salient features of SIC and SIC/XE architectures. (05 Marks)
- b. Write sequence of instructions in SIC and SIC/XE to divide BETA by GAMMA, setting ALPHA to the integer portion of quotient clearly specify the differences between SIC and SIC/XE program. (05 Marks)
- c. For the below memory configuration, obtain the values stored at the largest address for the following machine instructions:
- (i) 032600 (ii) 03C300 (iii) 022030  
 (iv) 010030 (v) 0310C303

Memory Address	Contents
3030	003600
3600	103000
6390	00C303
C303	003030

(B) = 006000  
 (PC) = 003000  
 (X) = 000090

(10 Marks)

- 2 Write a program for SIC architecture to read a file from an input device and write on to an output devices. The program must be written using two different subroutines, RDREC and WRREC that read a record to the output file. For the same source program generate the object code using the following table.

opcode	Machine code	opcode	Machine code	opcode	Machine code
STL M	14	STA M	0C	STCH M	54
JSUB M	48	LDL M	08	TIX M	2C
LDA M	00	RSUB	4C	JLT M	38
COMP M	28	LDX M	04	STX M	10
JEQ M	30	TD M	E0	LDCH M	50
J M	3C	RD M	D8	WD M	DC

(20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 3 a. What are literals? Explain their usage with an example. (05 Marks)  
 b. What are program blocks? Explain. For the source program written for Q2, create program blocks that contain instructions, smaller data and larger data. Generate the object code for the following line of the source program, whose operand is defined at line number 100 as follows. Use program counter relative address to generate address of operand.

Line	LOC	Block	Source Statement
20	0006	0	LDA LBNPTH

100	0003	1	LENGTH RESW 1
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The address and length of each program block is given below:

Block name (default)	Block numbers	Address	Length
	0	0000	0066
CDATA (for smaller data)	1	0066	000B
CBLKS (for larger data)	2	0071	1000

(15 Marks)

- 4 a. What is a Loader? Explain the algorithm for absolute loader. (10 Marks)  
 b. State the difference between linking loader and linkage editor. Explain how object program can be processed using linkage editor. (10 Marks)

### PART - B

- 5 a. What is an interactive editor? Explain the typical editor structure. (10 Marks)  
 b. Define tracing and trace back in debugging functions. (04 Marks)  
 c. Write a note on the concept of user interface criteria in a text editor. (06 Marks)
- 6 a. What is a MACRO? Briefly discuss various data structures to design a MACRO processor. (10 Marks)  
 b. Explain briefly machine independent macro processor features. (10 Marks)
- 7 a. Explain different sections of Lex program with an example program. (05 Marks)  
 b. Explain with an example, how a Lex program is combined with a YACC program. (05 Marks)  
 c. Write a Lex program to count number of characters, words, spaces and lines in a given text stored in a file. (10 Marks)
- 8 a. Explain shift reduce parsing with an example. (05 Marks)  
 b. What is YACC? Explain the different sections used in writing the YACC specification. (05 Marks)  
 c. Write a YACC program to accept set of strings of the language  $L = \{a^n b^m/n \geq 5 \text{ and } m \geq 3\}$  (10 Marks)

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