

DIVISION OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF ENGINEERING
B.TECH DEGREE V SEMESTER FIRST INTERNAL EXAMINATION,
OCTOBER 2023
CS 19-202-0502 SYSTEM PROGRAMMING

Faculty: Mrs. Minu Poullose

Time: 2Hrs

Max. Marks: 50

CO1:1. Familiarize the basics of system programs like assemblers, macro processors, linkers, loaders and operating systems.

CO2: 2. Design, analyze and implement one pass, two or multi pass assembler.

Part A (Answer All Questions)

(4 x 5 = 20)

No					CO	PO	BL	Marks	
I.	a. What is a literal? Differentiate between immediate operands and literals.				1	2,3,4	1	5	
	b. Consider the statements in SIC program being assembled using a 2-pass assembler.				2	2,3	4	5	
	Line no.	Location	Label	Opcode					Operand
	10	1000	LENGTH	RESW					4
	20	-----	NEW	WORD	3				
What will be the address value assigned to symbol NEW during pass1									
	c. 'System software is machine dependent.' Justify the statement.				1	2,3,4	2	5	
	d. Give the absolute loader algorithm				1	2,3,4	1	5	

(3x10 = 30)

Part B (Answer Any 3 Questions)

II.	Design the algorithm for pass 1 operations of a two-pass assembler for SIC architecture. Also explain the data structures used for it.	2	2,3	3	10
III.	Differentiate Program blocks and Control Sections. Explain how address calculation is performed in the case of program blocks.	2	2,3	2	10
IV.	a) Explain what will happen if a program is loaded in a location different from the starting address specified in the program.	1	2,3,4	2	3

	b) With an example explain program relocation. Is there a need to use modification record for the given SIC/XE program segment. Explain your answer. If yes, show the contents of modification record.	2	2,3	2	6																																																							
	<table><tr><td>20</td><td>000A</td><td></td><td>LDA</td><td>LENGTH</td></tr><tr><td>25</td><td>000D</td><td></td><td>COMP</td><td>#0</td></tr><tr><td>30</td><td>0010</td><td></td><td>JEQ</td><td>ENDFIL</td></tr><tr><td>35</td><td>0013</td><td></td><td>+JSUB</td><td>WRREC</td></tr><tr><td>40</td><td>0017</td><td></td><td>J</td><td>CLOOP</td></tr><tr><td>45</td><td>001A</td><td>ENDFIL</td><td>LDA</td><td>=C' EOF '</td></tr><tr><td>50</td><td>001D</td><td></td><td>STA</td><td>BUFFER</td></tr><tr><td>55</td><td>0020</td><td></td><td>LDA</td><td>#1</td></tr><tr><td>60</td><td>0023</td><td></td><td>STA</td><td>LENGTH</td></tr><tr><td>65</td><td>0026</td><td></td><td>+JSUB</td><td>WRREC</td></tr><tr><td>70</td><td>002A</td><td></td><td>J</td><td>@RETADR</td></tr></table>	20	000A		LDA	LENGTH	25	000D		COMP	#0	30	0010		JEQ	ENDFIL	35	0013		+JSUB	WRREC	40	0017		J	CLOOP	45	001A	ENDFIL	LDA	=C' EOF '	50	001D		STA	BUFFER	55	0020		LDA	#1	60	0023		STA	LENGTH	65	0026		+JSUB	WRREC	70	002A		J	@RETADR				
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IV.	List and explain the machine dependent assembler features	1	2,3,4	3	10																																																							
