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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S,FE) (FT/WP), (S3 PT) Examination May 2025 (2019 Scheme)

Course Code: CST305

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	What is system software? List out the differences between system software and application software.	3
2	Explain about various registers used in SIC/ XE.	3
3	What are assembler directives? Explain the difference between assembler directives WORD and RESW.	3
4	Describe the addressing modes and instruction format of SIC machine.	3
5	Write notes on literals. What are the different ways of storing the literal values?	3
6	Narrate notes on program relocation and different schemes for relocation.	3
7	What is Linkage editor? Explain using diagram.	3
8	Explain the formats and purpose of revised modification record used along with control sections.	3
9	Discuss various functions of device drivers.	3
10	Why Debugging is important? Explain different debugging techniques.	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Explain the addressing modes supported by SIC/ XE machine with suitable examples.	8
	b)	How are characters, integers and floating-point numbers represented in SIC/XE?	6
12	a)	Explain about SIC/XE machine architecture in detail.	10

b) Write an SIC program to find the largest number among FIRST, SECOND and THIRD. 4

Module -2

13 a) Explain the data structures used by two pass assembler, and write the algorithm for pass 2 of two pass assembler. 6

b) Explain the functions of assembler. Describe the format of the object program generated by the SIC assembler, explain the content of each record type. 8

14 a) Write and explain the algorithm for pass 1 of two pass assembler by highlighting the use of different data structures needed for the translation. 6

b) Assemble the following instructions of SIC/XE. Explain the instruction formats and addressing modes used in each instruction. 8

Location	Symbol field	Opcode field	Operand field
0003		LDB	#LENGTH
…		…	…
001D		STA	BUFFER
0020		LDA	#3
…		…	…
002A		J	@RETADR
…		…	…
0030	RETADR	RESW	1
0033	LENGTH	RESW	1
0036	BUFFER	RESB	4096

The required opcode values are given below.

Mnemonic	Opcode value

LDB m	68
STA m	0C
LDA m	00
J m	3C

Module -3

15 a) Differentiate the concept of Program blocks and Control Sections using proper examples. 8

b) Explain the working of a multi pass assembler with example. 6

16 a) Explain the following 8

i) Method of handling Forward references by single pass assemblers, using the algorithm.

ii) Relocation bit scheme for SIC machine, using example.

b) Explain the difference between the following: 6

i) LDA #3

ii)
```
THREE  EQU 3
...
LDA  #THREE
```

iii)
```
THREE  EQU 3
...
LDA THREE
```

Module -4

17 a) Explain the two passes of linking loader using algorithms and associated data structures. 9

b) Write notes on the different loader design options. 5

18 a) Write short note on the following terms: 6

i) Dynamic Linking

ii) linking loader

ii) Bootstrap loader

b) Write notes on machine dependent loader features. How are these features implemented in Linking loader? 8

Module -5

19 a) Explain the algorithm and data structures for one pass Macro processor. 10

b) Explain the general design of device driver. 4

20 a) Draw and explain the functions of each block in the structure of a typical text editor. 8

b) Describe macro definition and expansion with the help of examples. 6

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