C **1100CST305122102**

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (R, S) / S3 (PT) (S,FE) / S5 (WP) (R) Examination November 2024 (2019 Scheme)

Course Code: CST 305

Course Name: SYSTEM SOFTWARE

Max. Marks: 100   Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)   Marks

1	Write a SIC code to show the use of TD instruction and explain its working.	3
2	How are floating point numbers represented in SIC/ XE?	3
3	Explain the format of object program generated by a two-pass SIC assembler by highlighting contents of each record type.	3
4	Define assembler directives. Describe any four assembler directives in SIC.	3
5	Differentiate absolute expression and relative expression. Give an example each.	3
6	Explain literal pool and LITTAB.	3
7	Describe Bootstrap loader.	3
8	Explain dynamic linking.	3
9	With an example explain conditional macro expansion.	3
10	How should a programmer decide whether to use a macro or a subroutine to accomplish a given logical function?	3

PART B

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

Module -1

11	a)	Explain the architecture of SIC /XE machine.	9
	b)	SIC assembly code is upward compatible with SIC/XE. How is this achieved? Explain with respect to the addressing modes and instruction formats.	5
12	a)	Explain the architecture of SIC machine.	8
	b)	Explain the following: (i) Compilers (ii) Operating system (iii) Interpreters	6

Module -2

13	a)	For the following SIC instructions which is assembled using a 2-pass	10

assembler, design an algorithm for performing the pass 1 operations. Also generate object code and build various data structures and variables for the following code.

Location	Label	Opcode	Operand
4000	TEST	START	4000
......	FIRST	LDA	FIVE
....		STA	ALPHA
....	ALPHA	RESW	2
......	FIVE	WORD	5

b) Write a sequence of instructions for SIC/XE to divide BETA by GAMMA and to store the integer quotient in ALPHA and remainder in DELTA.　4

14　a) Write a SIC/XE program to set all the 100 elements of an array A to 0. Here A is an array of 100 words. Use immediate addressing and register-to-register instructions to make the process as efficient as possible.　5

b) List out the basic functions of assembler. Identify the uses of SYMTAB and OPTAB during pass 1 and pass 2 of a two-pass assembler.　9

Module -3

15　a) Describe Program Blocks. With a suitable example, explain how Program Blocks are handled by SIC assembler.　8

b) Demonstrate the concept of program relocation with the help of a suitable example.　6

16　a) Describe control section. With suitable example, explain how control sections are handled by SIC assembler.　7

b) What is the need for a multi-pass assembler? With the help of an example show how forward references are handled by a multi-pass assembler.　7

Module -4

17　a) What are the data structures used by a two-pass linking loader algorithm?　4

b) Explain pass two algorithm for a two-pass linking loader.　10

18 a) Explain any two machine independent loader features.   8

    b) Differentiate between linking loader and linkage editor, with a diagram. Which   6
        of these is preferable in a program development environment? Why?

Module -5

19 a) Explain the structure of a text editor using a neat diagram.   10

    b) What are the data structures used by a single pass macro processor algorithm?   4
        Give their functions.

20 a) Explain Debugging Method by (i) Induction, (ii) Deduction and (iii)   10
        Backtracking.

    b) Differentiate various types of device drivers.   4

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