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SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), DECEMBER 2023
COMPUTER SCIENCE AND ENGINEERING

(2020 SCHEME)

Course Code : 20CST305

Course Name: System Software

Max. Marks : 100 **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Distinguish between interpreter and compiler.
2. What is the difference between the instructions LDA #5 and LDA FIVE? Explain how each instruction is executed.
3. Identify the addressing modes in the following machine code for SIC /XE machine:
   (i) 010030 (ii) 032600
4. List the basic assembler functions.
5. With the help of an example explain the use of BASE assembler directive.
6. Differentiate Define record and Refer record.
7. What is the use of bitmasks? Illustrate with example.
8. Give the absolute loader algorithm.
9. Explain macro definition and macro expansion.
10. Discuss the debugging functions and capabilities.

PART B

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

MODULE I

11. a) Compare the features of Standard SIC and SIC/XE architecture. (9)
    b) Explain assembler directives. List any four assembler directives in the SIC machine. (5)

OR

12. a) With suitable examples, identify any five addressing modes handled in SIC/XE during assembling? (10)

b) Compare the following with reference to SIC and SIC/XE machines: (4)
i. Memory ii. Instruction format

MODULE II

13. a) Suppose RECORD contains a 100-byte record. Write a subroutine for SIC that will write this record onto device 05. (5)

b) Consider the source statements in SIC programming. (9)

```
START 1000
LDA INPUT
STA BUFFER
LDA NEW
STA LENGTH
NEW WORD 3
LENGTH RESW 3
INPUT BYTE X'F1'
BUFFER RESB 4
```

Identify the addresses assigned to the above statements during assembling? Also generate the object program. (LDA-00, STA-0C).

OR

14. a) Write the sequence of instructions in SIC, to transfer the string "EXAMINATION" stored at location LOCA1 to LOCA2. (4)

b) With example, explain the Pass1 Algorithm for a two-pass SIC Assembler along with the data structures used in it. (10)

MODULE III

15. a) Employ a multipass assembler to evaluate the following expressions. (7)

Expression No.	Loc	Source Statement
1		HALFSZ EQU MAXLEN/2
2		MAXLEN EQU BUFEND-BUFFER
3		PREVBT EQU BUFFER-1
4	4034	BUFFER RESB 4096
5		BUFEND EQU *

b) Explain with an example how relocation problem is handled by an assembler. (7)

OR

16. a) With example, explain how forward references are resolved during program assembling in a single pass assembler. (6)

b) With suitable examples, explain any two machine independent assembler features. (8)

MODULE IV

17. a) Which are the data structures used during the operation of a linking loader? Write the algorithm for Pass 2 of a Linking Loader. (10)

b) Explain Dynamic Linking with an example. (4)

OR

18. a) Justify the need for having two passes in a linking loader. Illustrate the data structures used for a linking loader, showing how they are used in each pass. (8)

b) With the help of a diagram, compare linking loader and linkage editor. (6)

MODULE V

19. a) A new hardware device is plugged into a system. Which is the appropriate system software needed for the proper working of the new hardware? Give its functionalities and general architecture. (10)

b) What is the difference between macro invocation and subroutine call? (4)

OR

20. a) Explain the following machine independent macro processor features: (10)
i. Generation of unique labels. ii. Keyword macro parameters

b) Differentiate between character and block device drivers. (4)

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