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MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

Fourth Semester B.Tech. Degree Examination, May, 2026

Course Code: B24CS2T07

Course Name: SYSTEM SOFTWARE

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. What are the functions of Operating System?
2. Write a SIC code to show the use of TD instruction and explain its working.
3. Write an SIC/XE program to calculate $\text{ALPHA} = 4 * \text{BETA} - 9$. Use immediate addressing for the constants.
4. Describe the function of the Location Counter (LOCCTR) during Pass 1 of a two-pass assembler.
5. What is program relocation? Why is relocation necessary in system software?
6. What are program blocks? How do they differ from control sections?
7. Define program linking. What is the need for linking in modular programs?
8. Differentiate between the operations carried out in Pass 1 and Pass 2 of a linking loader.
9. Illustrate macro expansion with an example.
10. What is meant by debugging by induction?

PART - B: 70 Marks (5 Qns x 14 Marks)

Answer any One full question from each module.

Module 1

11. a) What are assembler directives? Explain their role in the assembly process. (6 Marks)
b) Discuss in detail the following directives with suitable examples: START, END, BYTE, WORD, RESB, RESW. (8 Marks)

OR

12. a) Explain the structure and functions of a text editor. (7 Marks)
b) Describe the functions and debugging methods used in a debugger. (7 Marks)

Module 2

13. a) Write a SIC program to find the sum of 10 numbers stored in consecutive memory locations. (8 Marks)
b) Explain the role of each instruction used in the program. (6 Marks)

OR

14. a) With a neat diagram, explain the workflow from source program to object program. (8 Marks)
b) Why is the End record important in program execution? Explain with example. (6 Marks)

Module 3

15. a) What are the problems encountered by single pass assembler? How it is resolved? (7 Marks)
b) Explain any 2 symbol defining statements. What are its restrictions? (7 Marks)

OR

16. Explain how expressions are evaluated in assemblers. Discuss absolute vs. relative expressions with two small examples.

Module 4

17. Describe the differences between linking loader, linkage editor, and dynamic linking. Give suitable examples for each.

OR

18. a) What is a Bootstrap Loader? Explain the need for bootstrapping. (7 Marks)
b) Describe the design and working of a Simple Bootstrap Loader with a neat diagram. (7 Marks)

Module 5

19. Draw and explain the general structure of a text editor. Describe how the editing buffer and viewing buffer interact.

OR

20. Explain the anatomy of a device driver. Distinguish between character device drivers and block device drivers with examples.
