

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3160715

Date: 01/06/2026

Subject Name: System Software

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Explain semantic gap, specification gap and execution gap. **03**
 - (b) Explain the role of Symbol Table and Literal Table in the assembly process. **04**
 - (c) Define System Software. Explain the Life Cycle of a Source Program with a neat diagram. **07**
- Q.2**
- (a) Compare and contrast Top-Down and Bottom-Up Parsing techniques. **03**
 - (b) What is a Macro? Explain the macro expansion process with an example. **04**
 - (c) Explain various Assembler directives with suitable example. **07**
- OR
- Q.2**
- (c) Describe following data structures: OPTAB, SYMTAB, LITTAB and POOLTAB. **07**
- Q.3**
- (a) What is ambiguity in grammar? Eliminate left recursion from the following grammar:
 $A \rightarrow Aa \mid b$ **03**
 - (b) List the types of errors encountered during program execution. **04**
 - (c) Explain the flowchart of a Single-Pass Assembler. What are its advantages and limitations compared to a Two-Pass Assembler? **07**
- OR
- Q.3**
- (a) Define: Parse tree, Syntax tree, DAG **03**
 - (b) Describe the functions of a Linker. Explain the concept of Dynamic Linking with its benefits. **04**
 - (c) What is code optimization? Discuss any five techniques for code optimization used in compilers. **07**
- Q.4**
- (a) What is a self-relocating program? How does it work? **03**
 - (b) Explain basic structure of a LEX program. **04**
 - (c) Explain the phases of compilation, from source code to target code, with diagram. **07**
- OR
- Q.4**
- (a) Compare and contrast Static and Dynamic Linking. **03**
 - (b) Write a short note on the Java Virtual Machine (JVM). **04**

- (c) Given a grammar, 07
 $E \rightarrow TA,$
 $A \rightarrow +TA \mid \varepsilon$
 $T \rightarrow VB$
 $B \rightarrow *VB \mid \varepsilon$
 $V \rightarrow id \mid (E)$
Develop an LL (1) parser table and parse following string using the parsing table. id *
(id + id)

- Q.5 (a) Explain linking of overlay structured program. 03
(b) Explain use of AIF and AGO with example. 04
(c) What is interpreter? Explain pure & impure interpreters. 07

OR

- Q.5 (a) Explain Bootstrap loader. 03
(b) Difference between Procedure oriented language and Problem oriented language. 04
(c) What is program relocation? How relocation is performed by linker? Explain with example. 07
