

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2023****Subject Code:2170701****Date:12-12-2023****Subject Name: Compiler Design****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.

| | | MARKS |
|------------|---|-----------|
| Q.1 | (a) Describe the role of preprocessor, assembler and loader in program execution. | 03 |
| | (b) Compare and contrast compilers and interpreters. | 04 |
| | (c) Explain phases of compiler in context of front end and back end with example. Give the significance of both. | 07 |
| Q.2 | (a) Define following terms. 1) Handle pruning 2) Unambiguous grammar 3) Left recursion | 03 |
| | (b) What is common prefix problem? Write steps to solve it with example. | 04 |
| | (c) Construct NFA for following regular expression using Thompson's notation and then convert it into DFA. $ab^*a(a b)^*bb$. | 07 |
| OR | | |
| | (c) Construct SLR parsing table for the following grammar : $E \rightarrow T+E \mid T$ $T \rightarrow i$ | 07 |
| Q.3 | (a) What is sentinel? Explain with an example. | 03 |
| | (b) Differentiate synthesized and inherited attributes. | 04 |
| | (c) Construct LL(1) parsing table for the following Grammar after applying necessary action. $S \rightarrow 1AB \mid \epsilon$ $A \rightarrow 1AC \mid 0C$ $B \rightarrow 0S$ $C \rightarrow 1$ | 07 |
| OR | | |
| Q.3 | (a) What is operator grammar? Explain with example. | 03 |
| | (b) Construct LR (1) item set for following grammar. $E \rightarrow E+T \mid T$ $T \rightarrow T^*F \mid F$ $F \rightarrow id$ | 04 |
| | (c) Draw DFA for the following regular expression using firstpos(), lastpos () and followpos () functions. $(a b)^*abb$. | 07 |
| Q.4 | (a) Define basic block with a simple example. | 03 |
| | (b) Which are the different conflicts occurs during constructing LR parsing table? Explain in detail. | 04 |
| | (c) Explain the issues regarding code generation in compiler design with example. | 07 |
| OR | | |
| Q.4 | (a) Differentiate SLR, LALR and CLR. | 03 |
| | (b) Write a short note on peephole optimization. | 04 |

- (c) Explain quadruples, triple and indirect triple form of three address code with example. **07**
- Q.5** (a) Give the regular definition for unsigned numbers in Pascal and also construct transition diagram for that. **03**
- (b) Write a short note on symbol table. **04**
- (c) Explain all error recovery strategies using suitable examples. **07**
- OR**
- Q.5** (a) What is activation record? **03**
- (b) Explain any two methods of parameter passing. **04**
- (c) Write syntax directed definition for simple desk calculator. Using this definition, draw annotated parse tree for $3*5+4 n$. **07**
