Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022**

**Subject Code:3170701 Date:16/06/2022**

**Subject Name:Complier Design**

**Time:02:30 PM TO 05:00 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)** | Explain the roles of linker, loader and preprocessor. | **03** |
| | **(b)** | What is Input Buffering? Why it is used? | **04** |
| | **(c)** | Explain the language dependent and machine independent phases of compiler. Also List major functions done by compiler. | **07** |
| **Q.2** | **(a)** | Describe the role of lexical analyzer. | **03** |
| | **(b)** | Write the regular expression R over {0,1} or {a,b}:<br>1) The set of all strings with even number of a's followed by an odd number of b's.<br>2) The set of all strings that consist of alternating 0's and 1's | **04** |
| | **(c)** | Explain activation record in detail. | **07** |
| | | **OR** | |
| | **(c)** | What are conflicts in LR Parser? What are their types? Explain with an example. | **07** |
| **Q.3** | **(a)** | What do you mean by left recursion and how it is eliminated? | **03** |
| | **(b)** | What is ambiguous grammar? Show that S -> aS\|Sa\|a ia an ambiguous grammar. | **04** |
| | **(c)** | Consider the following grammar:<br>S' = S#<br>S -> ABC<br>A -> a\|bbD<br>B -> a\| Ɛ<br>C -> b\| Ɛ<br>D -> c\| Ɛ<br>Construct FIRST and FOLLOW for the grammar also design LL(1) parsing table for the grammar | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Differentiate between top down parser and bottom up parser. | **03** |
| | **(b)** | Explain handle and handle pruning | **04** |
| | **(c)** | Consider the following grammar<br>S -> AA<br>A -> aA<br>A -> b<br>And construct the LALR parsing table. | **07** |
| **Q.4** | **(a)** | Differentiate between S attributes and L attributes | **03** |
| | **(b)** | For the following production write the semantic action:<br>1. S -> E$ | **04** |

2. E -> E1 + E2
3. E -> E1 * E2
4. E - > digit

**(c)** Translate the following expression into quadruple, triple, and indirect triple: **07**

-(a+b)*(c+d)-(a+b+c)

**OR**

**Q.4** **(a)** Differentiate between parse tree and syntax tree **03**

**(b)** What is dependency graph? Explain with example. **04**

**(c)** Generate the three address code for the following program segment: **07**

```
While(a<c and b>d)
  Do if a=1 then c = c+1
    Else
     While a<=d
      Do a= a+b
```

**Q.5** **(a)** List the issues in code generation. **03**

**(b)** Discuss the functions of error handler. **04**

**(c)** What is DAG? What are its advantages in context of optimization? How does it help in eliminating common sub expression? **07**

**OR**

**Q.5** **(a)** What is global optimization? Name the 2 types of analysis performed for global optimization. **03**

**(b)** Explain the following with example **04**

1) Lexical phase error
2) Syntactic phase error

**(c)** What is peephole optimization? Explain with example. **07**

**********