CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Seventh Semester of B. Tech. Examination (C.E.)
May 2014
CE401 Compiler Construction (CC)

Date: 20.05.2014, Tuesday **Time: 01:30 p.m. To 04:30 p.m.** **Maximum Marks: 70**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Rough work is to be done in the last page of main supplementary, please don't write anything on the question paper.
5. Indicate clearly, the option(s) you attempt along with its respective question no.
6. Figures to the right indicate full marks.

SECTION-I

Q-1 **Answer the following questions.**

1. Write a difference between Compiler, Interpreter and assembler. **3**
2. Differentiate the following concepts: **4**
   a) Phase and Pass
   b) Lexeme and Token
   c) Top-Down and Bottom-Up Parsers
   d) Leftmost Derivation (LMD) and Rightmost Derivation (RMD)
3. Describe the LEX file structure with example. **4**

Q-2

[A] Write down the pros and cons of reducing number of phases in compiler. **3**

[B] Describe the issues in designing a lexical analyzer. Define the role of input buffer in lexical analysis. **5**

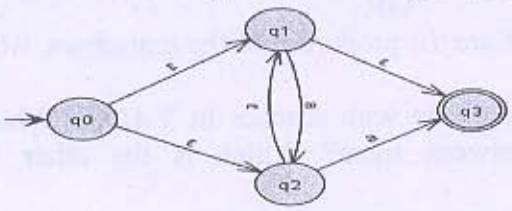
OR

[B] Explain in detail about error detection and recovery in syntax analysis. **5**

[C] What are necessary conditions to be carried out before the construction of predictive parser? **4**

Q-3

[A] Convert the following NFA-∧ into equivalent NFA. Here ε is a ∧-transition **4**



[B] What are shift reduce and reduce-reduce conflicts? **4**

OR

[B] Draw the FA for the given regular expression: **4**
0+10*+01*0

[C] Show that given grammer is ambiguous. **4**

S→ABA
A→aA|^
B→bB|^

OR

[C] Explain various methods to represent intermediate code in memory. **4**

SECTION-II

Q-4

1. Write quadruples for the expression: (a+b) * (c+d) – (a+b+c) 4
2. What is on demand dynamic memory? Compare between static memory allocation and dynamic memory allocation. 4
3. List and describe the error generated by the various phases of the compiler. 3

Q-5

[A] Explain the register allocation and register assignment in code generation. Also explain how address generation instructions are generated by a compiler for dynamic memory. 4

[B] Which are the attributes of a symbol table? Which are the phases of a compiler, a symbol table is associated with? Which are the suitable data structures for implementing a symbol table? 4

OR

[B] Explain the following concept with their usefulness: 4

1. Activation Record
2. Control Stack
3. Structural Optimization
4. Type Checking

[C] Construct the **canonical parsing table** for the following grammar: 4

S'→S
S→CC
C→cC| d

OR 4

[C] What is *code optimization*? What are the goals of *optimization*? List the criteria for selecting a code optimization technique. List and explain linear (peep-hole) *code optimization* techniques in brief.

Q-6

[A] State the following Grammar is **LR (1)** but **not LALR (1)** 4

S→ Aa | bAc | Bc | bBa
A→ d
B→ d

OR

[A] How does RDP work? What are the properties of the grammars, which can be parsed by RDP? 4

[B] How does the parser communicate with scanner in YACC? What is the communication medium between them? Which is the other way of communication? 4

[C] Construct the **parsing table** for the following Grammar: 4

L→A | B
A→n | i
B→(C)
C→ L,C | L

OR

[C] Parse the string **abbcde** using **SR technique** for the following Grammar: 4

S→aABe
A→Abc| B
B→d