[07 BENG – 3209] (C-19)

III/IV B.Tech. DEGREE EXAMINATION.

Second Semester

Computer Science and Engineering

COMPILER DESIGN

(Common with Information Technology)

(Effective from the admitted batch of 2015–2016)

(For the Academic Year 2020-2021 batch only)

Time : Three hours Maximum : 70 marks

First Question is compulsory

Answer any FOUR questions from the remaining.

Write all parts of any question at one place.

1. (a) Define bootstrapping of a compiler.

   (b) How does lexical analyzer help in the process of compilation?

   (c) Give the structure of LEX program.

   (d) Define left recursion. How to eliminate left recursion from CFG?

(e) Show that the grammar G : $S \rightarrow SS \mid aSb \mid bsa \mid \varepsilon$ is ambiguous.

(f) Define syntax directed translation.

(g) Define loop invariant. Give an example.

2. (a) What are different analysis phases of compiler? Explain the reasons for separation of lexical analysis from syntax analysis.

(b) Describe compiler construction tools with example.

3. (a) Construct DFA for the regular expression: $(0 + 1)^* 011$.

(b) Construct finite automata that accepts tokens: identifiers, decimal constants and integer constants.

4. (a) What is input buffering? Describe different input buffering schemes.

(b) Write a procedure to compute FIRST and FOLLOW of the grammar.

5. Construct predictive parsing table for the following grammar and verify the string (a + a) is accepting or not

$E \rightarrow E + T \mid T \quad T \rightarrow T * F \mid F \quad F \rightarrow (E) \mid a$

6. (a) What are the basic operations in Shift reduce parser? Find the shift reduce parser algorithm for the input string (a, (a, a)) using following grammar:

$S \rightarrow (L) \mid a, \quad L \rightarrow L, S \mid S$

(b) Write a procedure to construct parsing table in SLR parser.

7. (a) Explain about s–attributes and l– attributes with suitable example.

(b) Translate the expression: x = – (a + b) * (c + d) + (a + b + c) into (i) Quadruple (ii) Triple (iii) Indirect triple.

8. (a) What is Peephole optimization? Explain different Peep – hole optimization methods.

(b) What is a leader of basic block? Write an algorithm to find leaders.
