BTECH
(SEM VI) THEORY EXAMINATION 2018-19
COMPILER DESIGN

Time: 3 Hours   *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt** *all* **questions in brief.**   **2 x 7 = 14**

   a.   What are the two parts of a compilation? Explain briefly.
   b.   What is meant by viable prefixes?
   c.   What are the classifications of a compiler?
   d.   List the various error recovery strategies for a lexical analysis.
   e.   What is dangling else problem?
   f.   What are the various types of intermediate code representation?
   g.   Define peephole optimization.

SECTION B

2.   **Attempt any** *three* **of the following:**   **7 x 3 = 21**

   a.   Write the quadruples ,triple and indirect triple for the following expression:
        $$(x+y)*(y+z)+(x+y+z)$$

   b.   What are the problems with top down parsing? Write the algorithm for FIRST and FOLLOW.

   c.   Perform Shift Reduce Parsing for the given input strings using the grammar
        $$S\text{->}(L)|a$$
        $$L\text{->}L,S|S$$
        i)   (a,(a,a))
        ii) (a,a)

   d.   What is global data flow analysis? How does it use in code optimization?

   e.   Construct LR(0) parsing table for the following grammar
        S-> cB | ccA
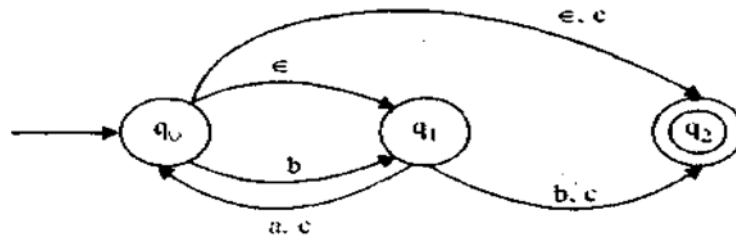   A->cA | a
        B-> ccB | b

SECTION C

3.   **Attempt any** *one* **part of the following:**   **7 x 1 = 7**

   (a) Convert following NFA to equivalent DFA and hence minimize the number of states in the DFA.

(b)   Explain the various parameter passing mechanisms of a high level language.

4.   Attempt any *one* part of the following: 7 x 1 = 7

   (a)   How would you represent the following equation using DAG?

            a:=b*-c+b*-c

   (b)   Distinguish between static scope and dynamic scope. Briefly explain access to non-local names in static scope.

5.   Attempt any *one* part of the following: 7 x 1 = 7

   (a)   Write short notes on the following with the help of example:
            (i)   Loop unrolling
            (ii)   Loop Jamming
            (iii)   Dominators
            (iv)   Viable Prefix

   (b)   Draw the format of Activation Record in stack allocation and explain each field in it.

6.   Attempt any *one* part of the following: 7 x 1 = 7

   (a)   Write down the translation procedure for control statement and switch statement

   (b)   Define Syntax Directed Translation. Construct an annotated parse tree for the expression   (4 * 7 + 1) * 2, using the simple desk calculator grammar.

7.   Attempt any *one* part of the following: 7 x 1 = 7

   (a)   Explain in detail the error recovery process in operator precedence parsing method.

   (b)   Explain what constitute a loop in flow graph and how will you do loop optimizations in code optimization of a compiler.