

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

$$S \rightarrow (L)|a$$

$$L \rightarrow L,S|S$$
 - 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

$$S \rightarrow cB | ccA$$

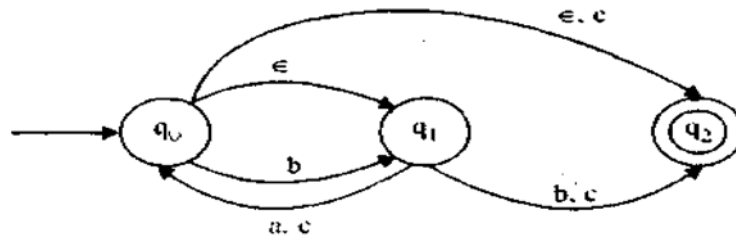
$$A \rightarrow cA | a$$

$$B \rightarrow ccB | b$$

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.