

9. (a) Explain DAG representation of basic blocks with example.
- (b) Explain various code optimization techniques. Discuss the strategies for loop optimization and dead code elimination.
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Roll No. ....

**67058**

**MCA 2nd Semester CBCS Scheme w.e.f.  
2016-17 (Re-Appeal)  
Examination – October, 2020  
COMPILER DESIGN  
Paper : 16MCA32C3**

*Time : 1.45 hours ] [ Maximum Marks : 80*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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**Note :** Attempt any *three* questions. All questions carry equal marks.

1. (a) What do you mean by cross-compiler ?
- (b) What is overlay ? Discuss linking of overlay structured program.
- (c) What is the purpose of lexical analysis phase ?
- (d) Discuss Chomsky classification of grammar.
- (e) Draw syntax tree for the expression :

$$a = b^* - c + b^* - c$$

- (f) What is a symbol table ? Discuss the typical entries in it.

(g) What are properties of optimizing compilers ?

(h) Draw the DAG for :

$$a = (a * b + c) - (a * b + c).$$

2. (a) Explain the problems faced by a one-pass assembler. Draw and explain the detailed flowchart for pass-2 of a two-pass assembler.

(b) What are different loading schemes ? Explain absolute loader scheme with its advantages and disadvantages.

3. (a) Explain use and fields of following tables of macro :

KPDTAB, MDT, EVTAB, SSTAB.

(b) What are various loading schemes ? Explain bootstrap loader with its merits and demerits.

4. (a) Write an algorithm to convert NFA to DFA and minimize DFA. Discuss with example.

(b) Explain the non-recursive implementation of predictive parsers with the help of grammar.

$$E \rightarrow E + T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow (E) \mid \text{id}$$

5. (a) Generate SLR parsing table for following grammar :

$$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$$

$$A \rightarrow d$$

$$B \rightarrow d$$

And parse the sentence "bdc" and "dd".

(b) How errors can be recovered in lexical phase of a compiler ? Explain.

6. (a) Explain quadruples and triples with example. Write three address code for the expression :

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

(b) Explain various run time storage allocation strategies.

7. (a) Construct a syntax directed definition for constructing a syntax tree for assignment statements.

$$S \rightarrow \text{id} := E$$

$$E \rightarrow E1 + E2$$

$$E \rightarrow E1 * E2$$

$$E \rightarrow -E1$$

$$E \rightarrow (E1)$$

$$E \rightarrow \text{id}$$

(b) Give the general structure of activation record. Explain the purpose of each component.

8. (a) Explain the main issues of code generation with example.

(b) Define peephole optimization. List the characteristics of peephole optimization.