

# DD-475

## M. Sc. (Second Semester) EXAMINATION, May/June, 2020

### COMPUTER SCIENCE

#### Paper Fourth

#### (Principle of Compiler Design)

*Time : Three Hours*

*Maximum Marks : 100*

**Note :** Attempt any *two* parts from each question. All questions carry equal marks.

1. (a) What are the phases of a compiler ? Explain the functions of each phase.  
(b) Construct parse tree and syntax tree for the statement  $A = B + C * D / F$ .  
(c) When you say that grammar is ambiguous ? Show that the grammar  $E \rightarrow E + E | E * E | (E) | a$  is ambiguous.
2. (a) Check whether the grammar  $S \rightarrow iEtS | iEtSeS | a, E \rightarrow b$  is a LL (1) grammar. Also define the FIRST and FOLLOW procedures.  
(b) Construct DFA for the regular expression  $ab(a + b)^*$ .

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- (c) Explain the role of Symbol table in compilation. What are the entries that are stored in symbol table ?
3. (a) Translate the arithmetic expression  $a + (b + c)/d$  into quadruples, triples and indirect triples.
- (b) How is memory allocation done for structure and how can they accessed ? Explain with an example.
- (c) What is activation record ? Explain different fields in activation record.
4. (a) What are the standard storage allocation strategies ? Explain them in detail.
- (b) What are the different types of error detected during compilation ? Give *five* different types of error detected with examples.
- (c) Write short notes on the following :
- (i) IOSUB
- (ii) File Control
5. (a) What are the major issues to be considered for code optimization ?
- (b) Explain global data flow analysis.
- (c) Explain with example the following terms :
- (i) Constant folding
- (ii) Induction variable elimination
- (iii) Copy propagation