

**M.Sc. Semester-II Examination 2017**  
**Computer Science**  
**Course : MCSC-22**  
**(Compiler Construction)**

**Time : 3 Hours**

**Full Marks : 40**

Questions are of value as indicated in the margin

Answer question number **1** and **any four** from the rest

1. Answer **any four** : 2×4=8
  - (a) Distinguish between synthesized and inherited attributes.
  - (b) What is the disadvantage of left recursive grammar?
  - (c) Draw the transition diagram for a C identifier.
  - (d) Define (i) kill (ii) gen
  - (e) What is cross-compiler?
  - (f) What are dominators?
2. (a) Write the subset construction method to convert NFA to DFA.  
(b) What are the different phases of a compiler? Explain with an example. 4+4=8
3. (a) Suppose a robot can be instructed to move one step east, west, north or south from its current position. A sequence of such instructions is generated by seq → seq intr | begin, intr → east | west | north | south write the syntax directed definition of the robot's position.  
(b) What are basic blocks? Discuss how a sequence of three-address codes can be partitioned into basic blocks? 4+4=8
4. (a) Define the functions firstpos, lastpos, followpos and nullable. Give the rules for computing them.  
(b) Compute the above functions for the regular expression  $abba(a|b)^*abba$ . 4+4=8
5. For the augmented grammar  $E' \rightarrow E, E \rightarrow E + T | T, T \rightarrow T * F | F, F \rightarrow (E) | id$  find  
(a) FIRST and FOLLOW sets. 3+2+3=8  
(b) the equivalent non left recursive grammar.  
(c) whether the grammar is LL(1).
6. (a) For the arithmetic expression  $(a + b) * (b - c) / (-e)$  find  
(i) a syntax tree (ii) three-address codes (iii) quadruples (iv) triples  
(b) What is a dag? Construct dag for the following basic block 4+4=8

$a = x * y$   
 $z = x$   
 $b = z * y$   
 $x = b$   
 $g = x * y$
7. (a) Discuss the code optimizing transformations. 6+2=8  
(b) What are value prefixes? Give examples.