B.Tech. IN COMPUTER SCIENCE & ENGINEERING

Term-End Examination

December, 2012

BICS-016 : SYSTEM PROGRAMMING AND COMPILER DESIGN

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt **any seven** questions.*

1. (a) Explain the various phases of Assembler.   5
    (b) How is linker different from loader ?   5

2. (a) Write a grammar whose sentences are in the   4
         regular expressions over the alphabet {a, b}.
    (b) Consider the following grammar :   6
         $E \rightarrow E + E \mid E - E \mid E * E \mid E/E \mid E \uparrow E$
         $E \rightarrow (E)$
         $E \rightarrow -E$
         $E \rightarrow id$
         Construct the parse tree for id*id + id.

3. Construct the DFA for the regular expression   10
    (a/b)*abb.

4. (a) What is abignity ? Explain using an   5
         example
    (b) Describe the various techniques used in   5
         DAG.

5. (a) Consider the following grammar for list structures :   **6**

$S \rightarrow a \mid ^ \mid (T)$

$T \rightarrow T, s \mid s$

In the above grammar, find leftmost and rightmost derivations for :

(i) (a, (a, a))

(ii) (((a, a), ^ , (a)), a)

(b) Differentiate between quadrupers and triples.   **4**

6. (a) What is symbol table ? Discuss the various data structures used in symbol table.   **7**

(b) List the problems associated with code generation phase of compiler design.   **3**

7. (a) Explain the phases of compiler design with block diagram.   **8**

(b) What is Syntax Directed translation ?   **2**

8. Consider the grammar :

$S \rightarrow AS/b$

$A \rightarrow SA/a$

(a) Is the grammar SLR ? If so, construct the SLR parsing table.   **6**

(b) Is the grammar LALR ? LL (1) ?   **4**

9. (a) Translate $a* - (b + c)$ into postfix form. 2

   (b) Considering the grammar of Q.5, compute 8
       LEADING & TRAILING.

10. Write short notes on *any two* : 5+5=10

    (a) Error detection and recovery

    (b) Predictive parser

    (c) MACRO