(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2476 Roll No.

B.Tech.

(SEM.VI) EVEN THEORY EXAMINATION 2012-13

COMPILER DESIGN

Time : 3 Hours *Total Marks : 100*

Note :– Attempt all questions. All questions carry equal marks.

1. Attempt any **four** of the following : **(5×4=20)**
   (a) What are the features of the good compiler ?
   (b) Explain why a system may have several compilers but normally a single linker.
   (c) Discuss the challenges in compiler design.
   (d) Which type of compiler is better - one running slowly but producing optimized code or another one running very fast but producing unoptimized code ?
   (e) How boot strapping is done on more than one machine ?
   (f) A RISC processor has smaller number of instructions and more no. of registers than a CISC machine. Describe the pros and cons of compiler design targeted to a RISC machine as compared to a CISC machine.
2. Attempt any **four** of the following : **(5×4=20)**
   (a) Discuss input buffering and preliminary scanning in lexical analysis.
   (b) Construct NFA for the following regular expression a(ab)*a. Convert the constructed NFA to DFA and then optimize it.

(c) What are the advantages of working with tools while developing a compiler module ?

(d) Compare the performance of the DFA with and without minimized states with respect to the run time complexity and storage space complexity.

(e) Discuss the hierarchical structure of programming language.

(f) Why it is difficult to simulate NFA ? Discuss a method for constructing an NFA from a regular expression.

3. Attempt any **two** of the following : **(10×2=20)**

(a) Discuss with an example the method of parsing a given sentence using an operator precedence parser.

(b) Consider the following context free grammar.

$A \rightarrow AA + \mid AA * \mid a$

and the string aa + a*

(i) Give a left most derivation of the string.

(ii) Give a right most derivation of the string.

(iii) Draw parse tree for the string.

(iv) Is the grammar ambiguous or unambiguous ? Justify your answer.

(c) What do you understand by left factoring ? Perform left factoring to dangling-else grammar.

$S \rightarrow iCts / iCtSeS / a$

$C \rightarrow b$

4. Attempt any **two** of the following : **(10×2=20)**

(a) Construct a syntax directed translation scheme that translates roman numerals into integers.

(b) Show that parsing actions and goto function of LR parser for the grammar.

$E \rightarrow E + T$

$E \rightarrow T$

$T \rightarrow T * F$

$T \rightarrow F$

$F \rightarrow (E)$

$F \rightarrow id$

(c) Translate the arithmetic expression a* – (b + c) into :

(i) a syntax tree

(ii) post fix notation

(iii) three address code.

5. Write short notes on any **two** parts of the following : **(10×2=20)**

(a) Data flow analysis

(b) Problem in code generation

(c) DAG representation.