

Registration No. :

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Total number of printed pages – 3

B. Tech
PCCS 4305

Sixth Semester Regular Examination – 2014

COMPILER DESIGN

BRANCH(S) : IT, ES-12

QUESTION CODE : F284

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.



1. Answer the following questions : 2 × 10
- (a) What is a Compiler ? List the functions of a compiler.
 - (b) Distinguish between Right most derivation and Left most derivation with example.
 - (c) Define 'Handle Pruning' in bottom-up parsing.
 - (d) What are the advantages of CLR parsing over SLR parsing scheme ?
 - (e) Translate the arithmetic expression $a * - (b + c)$ into a syntax tree.
 - (f) What are the advantages of LALR parsing over SLR and CLR methods ?
 - (g) Give an example of register allocation in code generation ?
 - (h) What is basic block ? Why is it used in code generation process ?
 - (i) Differentiate between control flow and flow graph.
 - (j) Explain unreachable codes with example.
2. (a) Draw and explain different phases of a compiler with appropriate example. 5
- (b) Construct the NFA, DFA and minimized DFA for the regular expression has single line comments with characters from the alphabet {a, b}. 5

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3. (a) Construct the SLR parsing for the given production below : 5
- $$S \rightarrow CC$$
- $$C \rightarrow cC$$
- $$C \rightarrow d$$
- (b) Construct the predictive parser for the following grammar : 5
- $$E \rightarrow TE'$$
- $$E' \rightarrow +TE' \mid \square$$
- $$T \rightarrow FT'$$
- $$T' \rightarrow *FT' \mid \square$$
- $$F \rightarrow (E) \mid id$$
4. (a) Check the ambiguity of the string (id + id * id) derived from the following grammar below : 5
- $$E \rightarrow E + E$$
- $$E \rightarrow E * E$$
- $$E \rightarrow (E)$$
- $$E \rightarrow id$$
- (b) What are the different types of errors a program can contain ? List out the error handling strategies. 5
5. (a) What do you mean by structure preserving transformation ? Explain four principles with example. 5
- (b) What are different storage allocation strategies ? Explain any two allocation strategies in detail. 5
6. (a) Construct the DAG for the following basic block : 5
- $$d := b * c$$
- $$e := a + b$$
- $$b := b * c$$
- $$a := e - d$$
- (b) Define LR (0) items. What are the three techniques for constructing LR parsing table ? 5



7. (a) Construct LALR (1) parsers for the following grammar :

5

$S \rightarrow L = R$

$S \rightarrow R$

$L \rightarrow * R$

$L \rightarrow id$

$R \rightarrow L$

(b) Elaborate on the peephole optimization.

5

8. Write notes on :

5×2

(a) Back patching

(b) Dependency graph.

