

B.TECH.

THEORY EXAMINATION (SEM-VI) 2016-17

COMPILER DESIGN

Time : 3 Hours

Max. Marks : 100

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. Attempt the following:

10 x 2 = 20

- (a) State any two reasons as to why phases of compiler should be grouped.
- (b) Write regular expression to describe a language consist of strings made of even numbers a & b.
- (c) Write a CF grammar to represent palindrome.
- (d) Why are quadruples preferred over triples in an optimizing compiler?
- (e) Give syntax directed translation for case statement.
- (f) What is a syntax tree? Draw the syntax tree for the following statement: $c \ b \ c \ b \ a \ - \ * \ + \ - \ * \ =$
- (g) How to perform register assignment for outer loops?
- (h) List out the criteria for code improving transformations.
- (i) Represent the following in flow graph $i=1; \text{sum}=0; \text{while } (i \leq 10) \{ \text{sum} += i; i++ \}$
- (j) What is the use of algebraic identities in optimization of basic blocks?

SECTION – B

2. Attempt any five of the following questions:

5 x 10 = 50

- (a) Explain in detail the process of compilation. Illustrate the output of each phase of compilation of the input $a=(b+c)*(b+c)*2$.
- (b) Construct the minimized DFA for the regular expression $(0+1)^*(0+1)10$.
- (c) What is an ambiguous grammar? Is the following grammar ambiguous? Prove $EE+|E(E)|id$. The grammar should be moved to the next line ,centered.
- (d) Draw NFA for the regular expression ab^*/ab .
- (e) How names can be looked up in the symbol table? Discuss.
- (f) Write an algorithm to partition a sequence of three address statements into basic blocks.
- (g) Discuss in detail the process of optimization of basic blocks. Give an example
- (h) How to subdivide a run-time memory into code and data areas. Explain

SECTION – C

Attempt any two of the following questions:

2 x 15 = 30

3 Consider the following grammar

$S \rightarrow AS|b$

$A \rightarrow SA|a$.

Construct the SLR parse table for the grammar. Show the actions of the parser for the input string "abab".

4 How would you convert the following into intermediate code? Give a suitable example.
i) Assignment Statements. ii) Case Statements

5 Define a directed acyclic graph. Construct a DAG and write the sequence of instructions for the expression $a+a*(b-c)+(b-c)*d$.