H   Roll No. ....

TCS–601/TIT–601

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2019

COMPILER DESIGN

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* parts of choice from (a), (b) and (c).   (10×2=20 Marks)

(a) Consider the following grammar :

$$S \rightarrow L = R \,|\, R$$
$$L \rightarrow *R \,|\, id$$
$$R \rightarrow L$$

Construct the CLR parsing table for the given grammar.

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4. Attempt any *two* parts of choice from (a), (b) and (c).   (10×2=20 Marks)

(a) What is the classification of code optimization ? Explain loop optimization techniques.

(b) Explain the following terms :
(i) Common sub-expression elimination
(ii) Code motion
(iii) Dead code elimination
(iv) Constant folding

(c) Consider the following program code :

```
p = 0;
i = 1;
do
{
    P = p + a[i] * b[i];
    i = i + 1;
} while (i <= 10)
```

Compute the dot product of two vectors a and b of length 10 and partition it into basic block.

5. Attempt any *two* parts of choice from (a), (b) and (c).   (10×2=20 Marks)

(a) Define symbol table. How the symbol table management can be done ?

(b) Explain all the types of errors with all the recovery techniques.

(c) Discuss the various source language issues that affect the organization of memory.

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(b) What is the role of lexical analyzer ? Discuss the difference between tokens, patterns and lexemes.

(c) Generate the three address code for the following program :

While (A < C and B > D) do

if A = 1, then C = C + 1

else

while A <= D do

A = A + 3

2. Attempt any *two* parts of choice from (a), (b) and (c).

(10×2=20 Marks)

(a) What do you mean by ambiguous grammar ? Prove that the following grammar is an ambiguous grammar :

S → iCtS | iCtSeS | a, C → b

(b) Write short notes on the following :

(i) Bootstrapping

(ii) Back patching

(iii) Input buffering

(iv) Issues in parsing

(c) Consider grammar :

S → aSbS | bSaS | ∈

Find out the LR(1) items.

3. Attempt any *two* parts of choice from (a), (b) and (c).

(10×2=20 Marks)

(a) Consider grammar :

E → TE`

E → +TE' | ∈

T → FT`

T' → *FT' | ∈

F → (E) | id

Find the FIRST and FOLLOW function for the above grammar.

(b) What do you mean by Syntax directed translation ? Convert the expression 3 + 4 * 5 from infix to postfix using the following rules :

E → E + T {printf ('+');}

T → {}

T → T* F{printf ('*');}

F → {}

F → num {printf(num.lval);}

(c) Explain about the operator precedence grammar. Parse the string id + id + id using the following grammar :

T → T + T | T * T | id