B.Tech. SEM -VII (Computer) 2014 Course (CBCS) : SUMMER - 2019

SUBJECT: COMPILER DESIGN

Date: Tuesday
Day: 14/05/2019

S-2019-2804

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data, wherever necessary.

Q.1 Construct NFA for the following regular expression letter | (letter or digit)* using Thomson's construction algorithm and then convert it into DFA. **(10)**

OR

Explain the role of input buffering technique in lexical analyzer with neat diagram. **(10)**
Write down LEX specification file for a typical class definition in C++.

Q.2 Explain with neat block diagram of non-recursive predictive parser and compute the first and follow rule for the following grammar: **(10)**

$E \rightarrow TQ$

$T \rightarrow FR$

$Q \rightarrow +TQ \mid -TQ \mid E$

$R \rightarrow \times FR \mid / FR \mid E$

$F \rightarrow (E) \mid id$

OR

Explain the different types of LR parsers with neat block diagram. **(10)**
Construct the transition diagram for the following grammar using SLR parser.

$S' \rightarrow S$

$S \rightarrow AA$

$A \rightarrow a\ A \mid b$

Q.3 Compare inherited attributes and synthesized attributes. **(10)**
Given below the syntax–directed definition(SDD),construct the annotated parse tree for the input expression: "int a,b"

$D \rightarrow TL$	$L.inh = T.type$
$T \rightarrow \text{int}$	$T.type = \text{int}eger$
$T \rightarrow float$	$T.type = float$
$L \rightarrow L1, id$	$L1.inh = L.inh$
	$addType(id.entry, L.inh)$
$L \rightarrow id$	$addType(id.entry, L.inh)$

P.T.O.

OR

Explain three–address code, quadruples and triples with examples. **(10)**

Construct DAG for

$a = b * c$

$d = b$

$e = d * c$

$b = e$

$f = b + c$

$g = f + d$

Q.4 **a)** Explain the following terms: **(06)**

i) Local Optimization
ii) Global Optimization

b) Write a note on: Machine dependent Optimization **(04)**

OR

a) Explain in detail 'Code Motion' Optimization. **(06)**

b) Write a note on: Induction Variable **(04)**

Q.5 **a)** Explain in detail next-use information with suitable example. **(06)**

b) List and explain design issues of a code generation. **(04)**

OR

a) Explain the term 'Basic Block' with different transformations. **(06)**

b) Write short note on: **(04)**

i) Target machine

ii) Peephole Optimization

Q.6 **a)** Discuss any five command line options of GCC. **(05)**

b) Explain in detail GCC architecture with neat diagram. **(05)**

OR

a) Explain in detail preprocessing unit of GCC. **(05)**

b) Write a note on: Levels of optimizations of GCC. **(05)**

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