53 (IT 603) CPDG

2019

COMPILER DESIGN

Paper : IT 603

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions.*

1. *(a)* Convert the following grammar to a regular grammar : 5

$S \rightarrow bcdeS$

$S = edcb$

(b) Convert the following grammar to an equivalent unambiguous grammar : 5

$S \rightarrow bSd$

$S \rightarrow bS$

$S \rightarrow Sd$

$S \rightarrow c$

Contd.

(c) Show that the following grammar is not $LL(K)$ for any K : 5

$$S \to Ab \mid Ac$$
$$A \to bA \mid \varepsilon$$

(d) Convert the following grammar to an $LL(1)$ grammar by left factoring : 5

$$S \to bcC$$
$$S \to bcDf$$
$$C \to dD$$
$$D \to eD \mid \varepsilon$$

2. Construct the $SLR(1)$ parser for

$$S \to b \mid Sd \mid Bde$$
$$B \to b$$

Are there any conflicts ? Contruct the $LR(1)$ parser for the grammar. Are there any conflicts ? Is this grammar $SLR(1)$? Is it $LR(1)$? 20

3. (a) Consider the following statement.

$$x = a/(b+c) - d * (e+f)$$

Perform register allocation assuming that

(i) only one register is available

(ii) two registers are available

(iii) three registers are available. 10

(b) Discuss the factors affecting target code generation. 10

4. (a) Show the annotated parse tree and code generation process for the following arithmetic expression

$$-(a+b) * (c+d) + (a * b + c)$$

10

(b) What is activation record ? Explain clearly the components of an activation record. 10

5. (a) What do you mean by runtime storage allocation ? Explain the differences between static and dynamic allocations. 10

(b) Discuss the importance of symbol table in compiler design. How is the symbol table manipulated at various phases of compilation ? 10

6. Write short notes on : 10×2=20

(a) Code Optimization

(b) Type Checking.