2015

MCA

Paper : 3.1

SYSTEM SOFTWARE

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions
(Questions 1 and 2 are Compulsory and answer any four rest of the questions)

1. Answer the following : $1 \times 10 = 10$

(i) A compiler that runs on one machine and produces the target code for another machine is known as ----
(a) Cross compiler
(b) Linker
(c) Preprocessor
(d) Assambler

(ii) The language accepted by Turing machine is
(a) Type 0 (ii) Type 1 (iii) Type 2
(iv) Type 3

(iii) A translator that takes as input a high-level language program and translates into machine language in one step is known as ----
(a) Compiler (b) Interpreter
(c) Preprocessor (d) Assambler

(iv) A tool for automatically generating a lexical analyzer for a language is defined as

(a) LEX (b) YACC (c) Handler

(iv) All of these

(v) Consider a grammar : $A \rightarrow aS_1 / aS_2$

(a) $A' \rightarrow aA_2$
$A \rightarrow S_1/S_2$

(b) $A \rightarrow aA'$
$A' \rightarrow aS_1/aS_2$

(c) $A \rightarrow aA'$
$A' \rightarrow S_1/S_2$

(d) none of these

(vi) Which two functions are required to construct a parsing table in predictive parsing technique?

(a) CLOSURE ( ) and GOTO ( )

(b) FIRST ( ) and FOLLOW ( )

(c) ACTION ( ) and GOTO ( )

(d) None of these.

(vii) Which of the following is the most powerful parsing method?

(a) LL (1) (b) Cannonical LR

(c) SLR (s) LALR

(viii) The CFL $L = \{a^n b^n / n \geq 1\}$ can be generated by the following CFG

(a) $S \rightarrow \varepsilon/ab/aSb$ (b) $S \rightarrow ab/aSb$

(c) $S \rightarrow \varepsilon/aSb$ (d) all of the above

(ix) A grammar generating more than one derivation for same sentence is known as ---

(a) Regular (b) Context-free

(c) Context-sensitive (d) ambigious

(x) Top-down parsing is a technique to find –

(a) Leftmost derivation (b) Rightmost derivation

(c) Leftmost derivation in reverse

(d) Rightmost derivation in reverse

2. What is token, pattern and lexeme. Explain with examples. 5

3. (a) Construct a NDFA accepting the set of all string over {a, b} ending in aba. Use it to construct a DFA accepting same set of strings. 2 + 5 = 7

(b) Using parsing table show that the given grammar is not LL(1). 8

$E \rightarrow iAcE / iAcEeE / a$

$A \rightarrow b$

3. (a) What are different types of Assambler Directives? What is literal? 5 + 2 = 7

(b) Explain Pass 2 of two pass assembler with algorithm and example. What is forward reference? 5 + 3 = 8

4. (a) What are the different types of parameter used in macro prototype statement? Explain with examples. 7

(b) MACRO

```
        CLEARMEN    &X, &N, & REG = AREG
        LCL         & M
& M     SET         0
        MOVER       & REG, = '0'
MORE    MOVEM       & REG, & X + &M
& M     SET         & M + 1
        AIF         (& M NE N) . MORE
        MEND
```

Write the contents of the data structures for call 8

CLEARMEN AREA, 10

5. (a) What is LEX? Write structure If Lex programe. 3 + 4 = 7

(b) Construct the parsing table for the following grammar. 8

$E \rightarrow TE'$

$E' \rightarrow +TE'/\varepsilon$

$T \rightarrow FT'$

$T' \rightarrow *TE'/\varepsilon$

$F \rightarrow (E)/id$

6. (a) Explain Left-factoring and Left-recursion with suitable example. 7

(b) Construct the LR (0) items for the following grammar : 8

$E \rightarrow E + T$

$T \rightarrow T * F / F$

$F \rightarrow (E) / id$

7. Write short notes (Any Three) : $3 \times 5 = 15$

(a) Predictive Parser

(b) LR Parser

(c) Bottom-up Parser

(d) Coss-compiler

(e) lexical analyzer

—— × ——