CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Seventh Semester of B. Tech. Examination (IT)

November 2013

IT404 Language Processor

Date: 23.11.2013, Saturday **Time: 10:00 a.m. To 01:00 p.m.** **Maximum Marks: 70**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION - I

Q - 1 (a) Explain the significance of lexical analyzer phase of compiler with an example. [05]

(b) Define : (i) semantic gap (ii) preprocessor [02]

Q - 2 (a) What is the responsibility of language processor? Explain language processing activities. [05]

(b) How forward reference problem is handled in single pass assembler? Explain with an example. [05]

(c) Construct a DFA to accept all strings which begin with 00. Also mention regular expression for the given string. [04]

OR

(b) What is an assembler? Explain assembly language statements with example. [05]

(c) What is macro preprocessor? Explain different types of macro with suitable example. [04]

Q - 3 (a) Construct NFA- ^ for following regular expression and convert it into DFA. Also prepare transition table for DFA. [05]

$$(a^* / b^*)^*$$

OR

(a) Construct minimized DFA using given transition table. Consider state 4 as accepting state. Also prepare transition table for minimized DFA. [05]

State / I/P symbol	1	2	3	4	5	6	7	8
a	2	1	4	4	4	7	6	7
b	1	3	2	1	6	5	7	4

(b) **Attempt Any Three.** [09]

1) Explain any one technique of symbol table implementation with an example.

2) Explain static and dynamic linking.

3) Define: (i) activation record (ii) call by value result (iii) handle

4) Write three address code for following code.

```
if ( a < b)
        x = x+1;
else if ( c < d)
        y = y+1;
```

SECTION – II

Q - 4 (a) Write a short note on input buffering technique. [03]

(b) What is an ambiguous grammar? Give an example of ambiguous grammar. [03]

Q - 5 (a) Explain linear code optimization techniques with an example. [06]

(b) Define: left recursive grammar. Eliminate the Left Recursion from following grammar. [04]

$S \rightarrow Aa \mid b$

$A \rightarrow Ac \mid Sd \mid \varepsilon$

OR

Q - 5 (a) Explain structural code optimization techniques with an example. [06]

(b) Perform the left factoring technique for following grammar. [04]

$A \rightarrow ad \mid a \mid ab \mid abc \mid b$

(c) Construct FIRST and FOLLOW set for following grammars. [04]

$S \rightarrow aBDh$

$B \rightarrow cC$

$C \rightarrow bC \mid \varepsilon$

$D \rightarrow EF$

$E \rightarrow g \mid \varepsilon$

$F \rightarrow f \mid \varepsilon$

Q - 6 Attempt Any Three. [15]

(a) List and explain in detail about different types of grammar with suitable example.

(b) List out the condition for any grammar to be LL (1). Draw LL (1) parsing table for below grammar and check whether it is LL(1) or not.

$S \rightarrow iEtSA \mid a$

$A \rightarrow eS \mid \varepsilon$

$E \rightarrow b$

(c) Construct LR(0) item-set for following grammar. Generate SLR parsing table for it.

(0) $S \rightarrow E$

(1) $E \rightarrow 1\ E$

(2) $E \rightarrow 1$

(d) Construct canonical LR(1) item set and generate LALR parsing table for below grammar.

$S \rightarrow AA$

$A \rightarrow aA$

$A \rightarrow b$

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