Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIIth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 170701 Date: 24/05/2012

Subject Name: Compiler Design

Time: 02:30 pm – 05:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

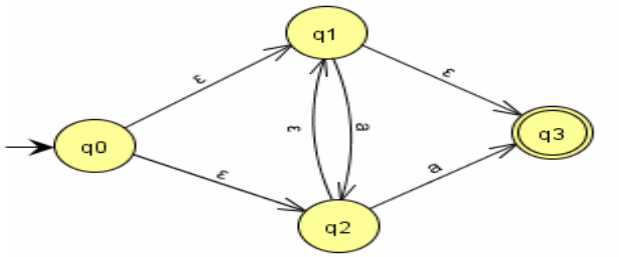
Q.1 **(a)** Explain the analysis synthesis model of compilation. List the factors that affect the design of compiler. Also List major functions done by compiler. **06**

(b) Find the Regular Expression corresponding to given statement, subset of {0,1}* **04**

1. The Language of all strings containing at least one 0 and at least one 1.
2. The Language of all strings containing 0's and 1's both are even.
3. The Language of all strings containing at most one pair of consecutive 1's.
4. The Language of all strings that do not end with 01.

(c) Explain non-recursive predictive parsers. Draw the block diagram of it. **04**

Q.2 **(a)** Convert the following NFA-∧ into equivalent NFA. Here ε is a ∧-transition. **07**



OR

(a) Construct a DFA for a given regular expression (010+00)*(10)* **07**

(b) How do the parser and scanner communicate? Explain with the block diagram communication between them. Also explain: What is input buffering? **07**

OR

(b) Write syntax directed Defination for translating following grammar for postfix notation. Also draw annotated parse tree for 9-5+2. **07**

expr -> expr + term
expr -> expr – term
term -> 0 | 1 |…..|9

Q.3 **(a)** Construct predictive parsing table for following. **07**

S -> A
A -> aB | Ad
B -> bBC | f
C -> g

(b) **Eliminate left recursion from the following grammar and rewrite the Grammar.** **03**

S -> Aa | b

A -> Ac | Sd | ϵ

(c) Explain the structure of an activation record with all its components. **04**

OR

Q.3 **(a)** **Do as directed.** **06**

1) What is attributed grammar? Which phase of the compilation process does it facilitate? Explain with example.

2) Discuss the factors affecting the target code generation.

(b) What is the difference between parse tree and syntax tree? Draw the parse tree for following expression: a= a + a * b + a * b * c – a / b + a * b and write three address code for it. **04**

(c) What does the linker do? What does the loader do? What does the preprocess do? Explain their role(s) in compilation process. **04**

Q.4 **(a)** **Perform the Left factoring of following Grammar** **04**

A → ad | a | ab | abc | b

(b) **Find out FIRST & FOLLOW set for all the Nonterminals** **06**

S→ AcB | cbB | Ba

A→ da | BC

B→ g | Є

C→ h | Є

(c) Explain various code optimization techniques. **04**

OR

Q.4 **(a)** What is Intermediate form of the code? What are the advantages of it? What are generally used intermediate forms? **Write N-Tuple notation for**: (a+b)*(c+d)-(a+b+c) **07**

(b) Explain: Error Recovery Strategies in Compiler in brief. **07**

Q.5 **(a)** **Test whether the following grammar is LL (1) or not. Construct predictive parsing table for it.** **07**

S→ 1AB | Є

A→ 1AC | 0C

B→ 0S

C→ 1

(b) **Construct the canonical parsing table for the following Grammar** **07**

S'→S

S→CC

C→cC|d

OR

Q.5 **(a)** **Generate the SLR parsing table for the following Grammar** **08**

S→Aa|bAc|bBa

A→d

B→d

(b) Explain: Symbol Table Management. How symbol table differs from other data structures? **03**

(c) Compare: Static v/s Dynamic Memory Allocation **03**

****