

## SVKM's NMIMS

### Mukesh Patel School of Technology Management & Engineering

Programme: B. Tech -Computer

Year: III Trimester: IX

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Batch: 2010-2011

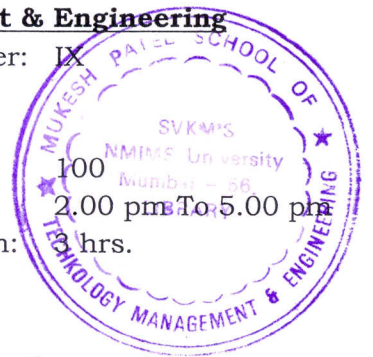
Subject: **Principles of Compiler Design**

Marks: 100  
Time: 2.00 pm To 5.00 pm

Date: 28/04/2012

Duration: 3 hrs.

### Re - Examination



**Instructions:** Candidate should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

1. Question No-1 is compulsory
2. Out of remaining questions, attempt any 4 questions
3. In all five questions to be attempted
4. All question carry equal marks.
5. Answer to each new question to be started on a fresh page.
6. Figures in bracket on the right hand side indicate full marks.

**1. Attempt All**

[2\*10 =20]

- a) What is a translator? Discuss the role of various phases of the compiler in the translator of source program to object code.
- b) Explain cross compiler. Suppose you have a working C compiler on machine A. Discuss the steps you would take to create a working compiler for another language C' on a machine B.

**2. Attempt All**

[2\*10 = 20]

- a) Discuss the action taken by every phase of the compiler on the knowing string:

$$A = B * C + D / E$$

- b) What is the use of deterministic finite automata in lexical analysis?  
Also give example

**3. Attempt All**

[2\*10 =20]

- a) Consider the following grammar:  
G:

$$E \rightarrow E * T / T$$

$$T \rightarrow T * F / F$$

$$F \rightarrow (E) / id$$

Construct the LR (0) canonical collection and also design the SLR parsing table.

- b) Give Algorithm for construction of predictive parsing table.  
Consider the following grammar and construct predictive parsing table:

$$S \rightarrow iEtSS_1$$

$$S_1 \rightarrow eS / E$$

$$E \rightarrow b$$

4. Attempt All

[2\*10 = 20]

- a) Consider the following grammar:

$$E \rightarrow E + T$$

$$E \rightarrow T$$

$$T \rightarrow T * F$$

$$T \rightarrow F$$

$$F \rightarrow id$$

And write the intermediate code for expression  $a + b * c$  as:

- i) Postfix representation
- ii) Syntax tree representation
- iii) Three address code representation

- b) Explain the back patching? Write the semantic action for following productions:

$$S \rightarrow \text{begins } L \text{ end}$$

$$S \rightarrow A$$

$$L \rightarrow L_1; MS$$

$$L \rightarrow S$$

5. Attempt All

[2\*10 = 20]

- a) What do you mean by DAG? Explain the algorithm for constructing a DAG with the help of suitable example.

- b) What is LR parser? How it is different from SLR. Construct LALR table for:

$$S \rightarrow Ba / bBc / dc / bda$$

$$B \rightarrow d$$

6. Attempt All

[2\*10 = 20]

- a) For the grammar having the productions:

$$A \rightarrow (A)A / \epsilon$$

Compute FIRST and FOLLOW set of A.

b) Consider the following grammar:

$$E \rightarrow E + E$$

$$E \rightarrow E * E$$

$$E \rightarrow (E)$$

$$E \rightarrow id$$

Using the above grammar, for the input string  $id_1 + id_2 * id_3$  show the stack implementation for shift reduce parsing.

7. Attempt any two

[2\*10 = 20]

- a) Left recursion and left factoring and how these are eliminated explain with suitable example.
- b) Discuss principal sources of optimization.
- c) Discuss the role of data flow analysis.