

Total No. of Questions : 8]

SEAT No. :

**P3991**

**[4959]-1152**

[Total No. of Pages : 3

**B.E. (Computer Engineering)**  
**PRINCIPLES OF MODERN COMPILER DESIGN**  
**(2012 Course) (Semester - I) (410442)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Assume suitable data if necessary.

**Q1) a)** Explain in detail the front end-Back end arrangement of compiler design. **[6]**

b) Check whether following grammer is LL (1). Also depict the moves by parser for input string "ab". **[6]**

S->aABb

A->c | ε

B->d | ε

c) Explain following terms with suitable examples:

i) S- Attributed Grammar

ii) L- Attributed Grammar

iii) Type Expression

iv) Back Patching **[8]**

OR

**Q2) a)** Explain the Role of Lexical Analyzer. Explain Interaction between Lexical Analyzer and parser. Define Lexeme, Token and Pattern with suitable example. **[6]**

*P.T.O.*

- b) Construct Predictive Parser for following grammar. [6]

$$S \rightarrow a B D h$$

$$B \rightarrow B b \mid c$$

$$D \rightarrow E F$$

$$E \rightarrow g \mid \epsilon$$

$$F \rightarrow f \mid \epsilon$$

- c) What is mean by 'Syntax Directed Definitions'? Give syntax directed translation scheme for "if E then S". [8]

- Q3) a) What are different issues in code generation? [6]

- b) What is DAG? Explain its use in code generation. Generate DAG for following: [6]

$$T1 = b + c$$

$$T2 = d * e$$

$$T3 = d + c$$

$$T4 = T2 * T3$$

$$T5 = T4 * f$$

$$X = T1 - T5$$

- c) Explain in brief following techniques: [6]

- i) Constant folding
- ii) Loop unrolling
- iii) Strength reduction

OR

- Q4)** a) What is need for next-use information? Explain how to compute next-use information. [6]
- b) Generate quadruples for the following:  $\text{if}(a>b)$  then  $x=p*q$ . [4]
- c) What is Register Allocation and Assignment Problem? [4]
- d) Write short note: Peephole Optimization. [4]

- Q5)** a) Write a note on importance of source language data representation. [6]
- b) Explain the row major and column major representation of arrays. [6]
- c) Explain type checking with respect to context handling. [4]

OR

- Q6)** a) Explain structure of a functional compiler. Discuss various issues related to compilation of functional languages . [6]
- b) Write short note on Java CC. [6]
- c) What is meant by desugaring? Why is this required? [4]

- Q7)** a) Write short note on NVidia CUDA compiler. [6]
- b) What is interpreter? Explain JVM as an example of interpreter. [4]
- c) How tuple space can be implemented on distributed memory systems.[6]

OR

- Q8)** a) Explain following points for parallel Object Oriented languages: Object location, object migration, object replication. [6]
- b) How cross compilation is achieved using XMLVM tool? [6]
- c) Write short note on nmake & cmake. [4]

**x x x**