

Total No. of Questions : 8]

SEAT No. :

P2037

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[5059]-642

B.E. (Computer Engineering)

PRINCIPLES OF MODERN COMPILER DESIGN

(2012 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the 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) Discuss the action taken by every phase of compiler on following string  
A = B\*C+D/E [6]

b) For the following grammar : [8]

S -> Aa | bAc | Bc | bBa

A -> d

B -> d

- i) Compute First & Follow set
- ii) Construct LR(1) parsing table

c) Explain following terms with suitable examples (any 2) : [6]

- i) S - Attributed Grammar
- ii) L - Attributed Grammar
- iii) Type Expression

OR

**Q2)** a) Explain following storage allocation schemes with proper examples :[6]

- i) Stack Storage Allocation
- ii) Static Storage Allocation
- iii) Heap Storage Allocation

P.T.O.

- b) Generate SLR parsing table for the given grammar and parse the string  $\text{id1} + \text{id2} + \text{id3} * \text{id4}$  [8]

$E \rightarrow E + T / T$

$T \rightarrow T * F / F$

$F \rightarrow \text{id}$

- c) What is mean by 'Syntax Directed Definitions'? Give syntax directed definition for any example arithmetic expression. [6]

- Q3)** a) Explain following optimizations with examples : [8]

- i) Common sub expression elimination
- ii) Strength reduction
- iii) Code movement
- iv) Variable propagation

- b) Compare Quadruples and Triples. Generate indirect triples for following : [6]  
 $a = b * c - d - e$

- c) What is Register Allocation and Assignment problem? [4]

OR

- Q4)** a) What is code optimization? Differentiate among local, global and loop optimization. [6]

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

$T1 = A + B$

$T2 = C + D$

$T3 = E - T2$

$T4 = T1 - T3$

- c) Explain with example: [6]

- i) Basic blocks and flow graph
- ii) Peephole optimization

- 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 lazy evaluation in functional languages? [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) Write short notes : [6]
- i) Tuple spaces
  - ii) XML VM
  - iii) JIT
- c) Discuss issues related to parallel compiler. Explain with respect to NVCC. [4]

