

Code No: 115AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year I Semester Examinations, February/March - 2016

COMPILER DESIGN

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**Part- A****(25 Marks)**

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|------|---|-----|
| 1.a) | Define Boot strapping.  | [2] |
| b)   | What is Context free grammar?   | [3] |
| c)   | What are the actions performed by Shift reduce parser?                          | [2] |
| d)   | Describe in brief about types of LR parser?                                     | [3] |
| e)   | What is type expression?  | [2] |
| f)   | Define Type Equivalence?  | [3] |
| g)   | Define Basic Block?   | [2] |
| h)   | How can you identify the leader in a Basic block?                               | [3] |
| i)   | Which graph is used for identifying the common sub expression in an expression? | [2] |
| j)   | What is meant register allocation and assignment?                               | [3] |

**Part-B****(50 Marks)**

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|------|---|-------|
| 2.a) | Define Regular Expression? Explain about the Properties of Regular Expressions. |       |
| b)   | Differentiate between Top down and bottom up parsing techniques.                | [5+5] |

**OR**

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|------|--|-------|
| 3.a) | Define Compiler? Explain in brief about the syntax and semantic analysis of a compiler with an example?                      |       |
| b)   | Construct a Predictive parsing table for the Grammar<br>$E \rightarrow E+T/T, T \rightarrow T * F/F, F \rightarrow (E)/id$ . | [5+5] |

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|------|--|--|
| 4.a) | Construct SLR parsing table for the following grammar. |  |
|------|--|--|

 $E \rightarrow E+T/T, T \rightarrow T * F/F, F \rightarrow (E)/id$ .

- |    |                              |       |
|----|------------------------------|-------|
| b) | Discuss in brief about Yacc. | [5+5] |
|----|------------------------------|-------|

**OR**

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|------|--|-------|
| 5.a) | Construct CLR Parsing table for the grammar $S \rightarrow I = R/R, I \rightarrow *R/id, R \rightarrow I$ .  |       |
| b)   | Define Ambiguous Grammar? Check whether the grammar $S \rightarrow aAB$<br>$A \rightarrow bC/cd, C \rightarrow cd, B \rightarrow c/d$ is Ambiguous or not. | [5+5] |

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|------|--|-------|
| 6.a) | Explain in detail about Polymorphism.                    |       |
| b)   | Explain in brief about Heap Storage allocation strategy. | [5+5] |

**OR**

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|------|---|-------|
| 7.a) | Construct an annotated parse tree for 9-5+2.            |       |
| b)   | Explain in brief about equivalence of type expressions. | [5+5] |

- 8.a) Explain in brief about different Principal sources of optimization techniques with suitable examples.
- b) Define Flow Graph? Explain how a given program can be converted in to flow graph. [5+5]

**OR**

- 9.a) What is DAG? Construct DAG for the following Basic block.  
D: = B\*C; E:= A+B; B:=B+C; A:=E-D;
- b) Explain how copy propagation can be done using data flow equation. [5+5]

10. Explain in detail the procedure that eliminates global common sub expression. [10]

**OR**

- 11.a) What are the object code forms? Explain the issues in code generation.
- b) Explain about machine dependent code optimization. [5+5]

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