

Code No: 115AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, November - 2015

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)

- 1.a) Define Cross Compiler. [2]
- b) Eliminate immediate left recursion for the following grammar:
 - $E \rightarrow E+T \mid T$
 - $T \rightarrow T*F \mid F$
 - $F \rightarrow (E) \mid id$ [3]
- c) List the rules for computing FOLLOW SET. [2]
- d) Define CLOSURE (I). [3]
- e) What is a symbol table? [2]
- f) What does a semantic analysis do? [3]
- g) Define basic block in a flow graph. [2]
- h) What is a DAG? Mention its applications [3]
- i) Generate a object code for following statements
 $a = b + c; \quad d = a + e$ [2]
- j) Mention the properties that a code generator should possess. [3]

PART - B (50 Marks)

2. What are the various phases of the compiler? Explain each phase in detail. [10]
- OR**
3. Construct the predictive parser for the following grammar: [10]
 - $S \rightarrow (L)/a$
 - $L \rightarrow L,S/S$
 4. Find the SLR parsing table for the given grammar:
 - $E \rightarrow E+E \mid E * E \mid (E) \mid id.$
 - And parse the sentence $(a+b)*c.$ [10]
- OR**
5. Construct an LALR Parsing table for the following grammar: [10]
 - $E \rightarrow E+T \mid T$
 - $T \rightarrow T * F \mid F$
 - $F \rightarrow id$

6. Generate intermediate code for the following code segment along with the required syntax directed translation scheme:

```
if(a>b)
x=a+b
else
x=a-b
```

Where a and x are of real and b of int type data.

[10]

OR

7. Give syntax directed translation scheme for simple desk circulator. [10]

8. Explain the following with an example:

- a) Redundant sub expression elimination
- b) Frequency reduction
- c) Copy propagation.

[3+3+4]

OR

9. Optimize the following code using various optimization techniques: [10]

```
i=1; s=0;
for (i=1; i<=3; i++)
for (j=1; j<=3; j++)
c[i][j]=c[i][j] + a[i][j] + b[i][j]
```

10. Explain in detail about machine dependent code optimization techniques. [10]

OR

11. Give an example to show how DAG is used for register allocation. [10]

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