

R13

Code No: 115AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, July/August - 2023

COMPILER DESIGN
(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) Define the term Tokens in lexical analysis phase. [2]
- b) Write a short note on Context Free Grammar. [3]
- c) List different rules to compute FIRSTSET. [2]
- d) Brief different types of LR parsers. [3]
- e) List different data structures used for symbol table. [2]
- f) Define syntax tree? Draw the syntax tree for the assignment statement.
a := b * -c + b * -c. [3]
- g) Define DAG. [2]
- h) Write a short note on global optimization. [3]
- i) Write in detail the issues in the design of code generator. [2]
- j) List the properties of code generation. [3]

PART - B

(50 Marks)

- 2.a) Differentiate between the Pass and Phase in compiler construction.
- b) Explain the general format of a LEX program with example. [5+5]

OR

3. Prepare the predictive parser for the following grammar:
S → a|b|(T)
T → T, S|S
Write down the necessary algorithms and define FIRST and FOLLOW. Show the behavior of the parser in the sentences.
a) (a,(a,a))
b) ((a,a),a,(a),a). [10]

4. State shift-reduce parsing? Explain in detail the conflicts that may occur during shift-reduce parsing. Illustrate with an example. [10]

OR

5. Construct SLR parsing table for the following grammar:
E → E+T/T
T → T*F/F
F → (E)/id. [10]

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- 6.a) Explain Intermediate code generation for Basic block.
- b) Write the advantages and disadvantages of heap storage allocation strategies. [5+5]

OR

QA QA QA QA QA QA QA G

- 7. Explain three address codes and mention its types. Generate the three-address code for the following C program fragment [10]

```
while(a > b)
{
  if (c < d)
    x = y + z;
  else
    x = y - z;
}
```

QA QA QA QA QA QA QA G

- 8.a) Explain the principle sources of code optimization in detail.
- b) Write a brief note on Data Flow Analysis of structural programs. [5+5]

OR

- 9.a) Construct the DAG for the following basic block.

```
D:=B*C
E:=A+B
B:=B+C
A:=E-D
```

QA QA QA QA QA QA QA G

- b) Explain in detail about Copy Propagation. [5+5]

- 10.a) Discuss various object code forms.
- b) Write a short note on DAG for register allocation. [5+5]

OR

- 11. Explain Machine dependent code optimization in detail with an example. [10]

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