Code No: 156AH **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, February/March - 2022

COMPILER DESIGN

(Computer Science and Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Write down the steps in constructing DFA for the regular expression (a/b)*aab(a/b)*.
b) Explain with an example how lex program perform lexical analysis for the arithmetic operators and identifiers in C? [7+8]

2.a) Give the basic structure of a compiler and explain various components in brief.
b) Describe the analysis-synthesis model of a compiler. [7+8]

3.a) What is left-factoring? Write the algorithm to eliminate left-factoring from a grammar. Explain the same with an example.
b) Consider the following grammar:
bexpr → bexpr **or** bterm | bterm
bterm → bterm **and** bfactor | bfactor
bfactor → **not** bfactor | (bexpr) | **true** | **false**
i) Construct a parse tree for the sentence **not (true or false)**
ii) Is this grammar ambiguous? Why? [7+8]

4. Show that the following grammar is LALR(1) [15]
S→Aa | bAc | dc | bda
A→d

5.a) What are the three forms of intermediate code representations? Explain them.
b) Give the syntax-directed definition of a simple desk calculator and construct an annotated parse tree for the input expression (4*7+1)*2. [7+8]

6. Explain about syntax directed translation of Boolean expressions with and without back patching. [15]

7.a) What is an activation record? Describe various components in an activation record considering a sample c program.
b) Write down the code generation algorithm and explain briefly. [8+7]

8. How to construct the basic block and compute DAG for the code fragment? Explain with the following code fragment. [15]

```
procedure fun(x,y,z)
begin
        y=z+1;
        z=z+x;
end fun
begin main()
        a=2;
        b=3;
        fun(A+B,A,B);
        print(A);
        end main
```

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