Subject Code: R15A32CS01

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III - B.Tech II Semester End Examinations, October - 2020
Subject: Compiler Design
(Common to CSE & IT)

Time: 2 Hours   **Max. Marks: 75**

- **Answer any Five questions**   (5 X 15=75 Marks)

1. a) Illustrate different phases of compiler with how the transformation of input to output takes place in each phase.   10M
    b) Write about Lex.   5M

2. a) Compute FIRST and FOLLOW functions for the grammar given below   9M

    $E \rightarrow TE'$

    $E' \rightarrow +TE' \mid \varepsilon$

    $T \rightarrow FT'$

    $T' \rightarrow *FT' \mid \varepsilon$

    $F \rightarrow (E) \mid id$

    b) Consider the following grammar and draw parse trees for the strings   6M
    (i) 00101   (ii) 00011

    $S \rightarrow A \mid B$

    $A \rightarrow 0A \mid \varepsilon$

    $B \rightarrow 0BA \mid 1B \mid \varepsilon$

3. Construct the SLR (1) parsing table and parse the given string id+id*id   15M

    $E' \rightarrow E$

    $E \rightarrow E+T$

    $E \rightarrow T$

    $T \rightarrow T*F$

    $T \rightarrow F$

    $F \rightarrow (E)$

    $F \rightarrow id$

4. a) Discuss about different types of intermediate code generation with an example for each.   8M
    b) Describe briefly the data structures for symbol table.   7M

5. a) Show how optimization is done using principle sources of optimization with examples.   8M
    b) Describe about code generation algorithm.   7M

6. a) What is the role and need of Lexical Analyzer?   7M

    b) Consider the Grammar   8M
    $E \rightarrow E+E \mid E*E \mid (E) \mid id$ and parse the string id + id*id using shift reduce parsing.

7. a) Compare Top Down and Bottom Up parsers with example for each.   6M
    b) Describe briefly about syntax directed definitions (SDD).   9M

8. a) What are the problems in code generation?   5M
    b) Write about Peephole optimization techniques.   10M

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III B.Tech I-Semester Supplementary Examinations, August-2022
Subject: Compiler Design
(Only for IT)

Time: 3Hours   Max Marks: 75

Section – A (Short Answer type questions)   (25Marks)

- **Answer all questions**

1. What is a Compiler?   2M
2. Outline Error-recovery actions in a lexical analyzer.   3M
3. Eliminate the ambiguity from the given grammar
   $E \rightarrow E*E \mid E-E \mid E^\wedge E \mid E/E \mid E+E \mid (E) \mid id.$ 3M
4. Construct a parse tree for the given string −(id*id) and the grammer is $E \rightarrow E*E \mid E-E$
   $\mid E+E \mid - (E) \mid id$ 2M
5. Compare Top down and bottom-up parsers.   2M
6. List out different types of LR parsers.   3M
7. Distinguish between synthesized and inherited attributes.   3M
8. List contents of an Activation Record.   2M
9. What is meant by Code Motion?   3M
10. Generate the code for x:=x+1 for target machine.   2M

Section—B (Essay questions)

- **Answer all questions, each question carries 10 marks.**   (5 x 10 =50 Marks)

11. A) For a source language statement x= y*z - 12, where x, y and z are float variables,
    * And – represents multiplication and subtraction on same data types, show and
    explain the input and output at each of the compiler phases.   10M

    OR

    B) i) Explain how the regular expressions and finite state automata are used for the
    specification and recognition of tokens?   7M
    ii) Discuss in brief about Lexical errors.   3M

12. A) Construct a predictive parsing table for the grammar
    E -> E + T / T, T -> T * F / F, F -> (E) /id.
    Verify whether the input string id + id * id is accepted by the grammar or not. 10M

    OR

    B) i) Discuss Context Free Grammar with suitable examples.   6M
    ii) Differentiate syntactic errors and semantic errors   4M

    P.T.O

13. A) Construct the CLR parsing table for the grammar.
    S -> L = R / R, L -> * R / id, R -> L.
    Using the CLR table constructed check the acceptance of input string id=id/id and
    also explain the algorithm for this.   10M

    OR

    B) Write a note on the following
    i) Compaction of LR parsing tables with an example.   6M
    ii) Comparison of SLR, LALR and CALR parsers.   4M

14. A) What is a three-address code? Mention its types. How would you implement these
    address statements? Explain with suitable examples.   10M

    OR

    B) i) Write syntax directed translation for arrays.   5M
    ii) Explain in brief about Stack Storage allocation strategy.   5M

15. A) Demonstrate Loop optimization, Copy Propagation, Dead code elimination,
    Redundant sub expression elimination with suitable examples.   10M

    OR

    B) i) Write simple code generation algorithm.   4M
    ii) Explain the functional issues to be considered while generating the object code.
       6M

QP Code: R18A32CS01

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III-B.Tech II-Semester Regular Examinations, May/June-2022
Subject: Compiler Design
(Common to CSE &AI)

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

Section – A (Short Answer type questions)
- **Answer all questions**   **(25Marks)**

1. Identify the roles of Lexical Analyzer   2M
2. Construct the NFA for given Regular Expression. (a|b)*abb   3M
3. What is Left Recursion? Remove the Left Recursion for given Grammar.
    $S \rightarrow (L) / a$
    $L \rightarrow L , S / S$ 2M
4. Consider the below grammar and obtain the left most derivation and right most derivation for the given string a+b*c.
    $E \rightarrow E+E \mid E*E \mid a \mid b \mid c$ 3M
5. CLR is more powerful than SLR.
    Justify the above statement.   2M
6. Find out the FIRST() and FOLLOW() of given grammar variables
    $S \rightarrow ABCDE$
    $A \rightarrow aBa \mid \varepsilon$
    $B \rightarrow b \mid \varepsilon$
    $C \rightarrow c \mid d$
    $D \rightarrow e \mid \varepsilon$
    $E \rightarrow f \mid \varepsilon$ 3M
7. What is activation record?   2M
8. Construct DAG and Syntax Tree for given expression.
    (a+b)*c-d*(a+b)   3M
9. What is copy propagation ? Explain with an example.   2M
10. Compute the cost of below set of instructions.   3M
    MOV R0,a
    MOV R1,b
    ADD R1,R2
    MOV c,R1

Section—B (Essay questions)
- **Answer all questions, each question carries 10 marks.**   **(5 x 10 =50 Marks)**

11. A) Explain the phases of compiler? And how the following statement will be translated into every phase. Position: = initial + rate * 60.

         OR

B) What is regular expression? Explain about different operators used in construction of regular expression with examples.

12. A) Construct the operator precedence parsing for the given grammar
    $E \rightarrow E + E \mid E *E \mid (E) \mid id$

         OR

B) Check whether the following grammar is a LL(1)grammar or not.
    $S \rightarrow iEtS \mid iEtSeS \mid a$
    $E \rightarrow b$

13. A) Check the below grammar is SLR or not.
    $S \rightarrow L = R$
    $S \rightarrow R$
    $L \rightarrow * R$
    $L \rightarrow id$
    $R \rightarrow L$

         OR

B) Construct the CLR(1) parsing table for the following grammar.
    $S \rightarrow CC$
    $C \rightarrow cC$
    $C \rightarrow d$

14. A) Derive the quadruples, triples and indirect triples for the following expressions.
    (a+b)/(c-d)*(e/f + g).

         OR

B) What is Symbol table ? Explain various symbol table organization techniques .

15. A) Explain local and loop optimization techniques.

         OR

B) Generate the code sequence using code generation algorithm for the following expression. x= (a+b)*(c-d)+((e/f)*(a+b))

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
(Formerly CVSR College of Engineering)
School of Engineering
III B.Tech -I Semester Supplementary Examinations, April 2017
Subject: Compiler Design
(Only for CSE)

Time : 3 Hours

Max.Marks: 75

Section—A (Short answer type questions)

- Answer **All** questions (25 Marks)

1. What is the role of hexical analyser? 2M
2. Write about Phase and Pass of a compiler 3M
3. Construct a parse tree for the string abaabb using the grammar 3M

    $S \rightarrow XY$

    $X \rightarrow aX \mid bX \mid a$

    $Y \rightarrow Ya \mid Yb \mid b$

4. Define Context Free Grammar. 3M
5. Compare Top-down and Bottom-up parsing techniques. 3M
6. Which LR parser in most efficient? 2M
7. Mention the types of intermediate codes. 2M
8. What is symbol table? 2M
9. List object code forms? 2M
10. Write any two code optimization technique with example for each. 3M

Section –B

- Answer **All** questions, each question carries equal marks (5 x 10 =50 Marks)

11. A) Illustrate different phases of compiler with a neat diagram. 10M

OR

B) Explain the functions of a lexical Analyzer with example. Also write about lexical errors. 10M

12. A) Compute FIRST and FOLLOW functions for the grammar given below

    $E \rightarrow TE'$
    $E' \rightarrow +TE' \mid \varepsilon$
    $T \rightarrow FT'$
    $T' \rightarrow *FT' \mid \varepsilon$
    $F \rightarrow (E) \mid id$

    10M

P.T.O

OR

B) Construct the operator precedence parser for the following grammar 10M
$$E \rightarrow E + E \mid E - E \mid E * E \mid (E) \mid id$$
and also parse the input id + id*id from the operator precedence relations.

13. A) Find the canonical collection of LR (0) items for the following grammar. 10M
    $E' \rightarrow E$
    $E \rightarrow E+T$
    $E \rightarrow T$
    $T \rightarrow T*F$
    $T \rightarrow F$
    $F \rightarrow (E)$
    $F \rightarrow id$

OR

B) Test whether the Grammar is SLR or not? 10M
    $E \rightarrow E + T \mid T$
    $T \rightarrow T *F \mid F$
    $F \rightarrow F \mid a \mid b$

14. A) i) Implement the three address code for the following code 5M

```
while(i<10)
{
x=0;
i=i+1;
}
```

ii) Write the quadruple, triple, indirect triple for the following expression. 5M
$(x + y)*(y + z) + (x + y + z)$

OR

B) i) Draw syntax and DAG for the expression a= a+b - a+b 5M

ii) Explain the organization of symbol table and data structures used for symbol table. 5M

15. A) Explain Principal sources of optimization techniques with an example for each. 10M

OR

B) i) Write about code generation algorithm. 5M

ii) Discuss about problems in generation of code. 5M

ANURAG GROUP OF INSTITUTIONS
Autonomous
School of Engineering
III B.Tech I-Semester Regular & Supplementary Examinations, Dec-2021/Jan-2022
Subject: Compiler Design
(Only for IT)

Time: 3Hours   Max Marks: 75

Section – A (Short Answer type questions)   (25Marks)

- **Answer all questions**

1.	Explain Input Buffering?	2M
2.	Mention Different Phases of Compiler?	3M
3.	Define Context Free Grammar?	2M
4.	Consider Grammar $S \rightarrow A/\varepsilon$	

$$A \rightarrow a/\varepsilon$$
$$B \rightarrow b/\varepsilon$$

	Compute FIRST For each Non-Terminal	3M
5.	List out Different Types of LR Parsers?	2M
6.	Mention Different Bottom up Parsers?	3M
7.	List the different Attributes of Symbol Table?	2M
8.	What is post fix notation? Explain with an example?	3M
9.	What is loop optimization? What are its types?	2M
10.	Generate the code for x: =x+1 for target machine?	3M

Section—B (Essay questions)

- **Answer all questions, each question carries 10 marks.   (5 x 10 =50 Marks)**

11. A) Consider the string x=y+z*60, write the translation in each phase of the compilation.

OR

B) Describe the general format of a LEX program with example?

12. A) Consider the following Grammar,

$S \rightarrow 0A|1B|0|1$
$A \rightarrow 0S|1B|1$
$B \rightarrow 0A|1S$

Construct Leftmost Derivation and Rightmost Derivation Trees for the sentence 1100101

OR

B) Check the following Grammar is LL(1) or not

$S \rightarrow iEtSS^1/ a$
$S^1 \rightarrow eS/\varepsilon$
$E \rightarrow b$

Give the Explanation whether (i,t,e,b,a) are Terminal Symbols?

P.T.O

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13. A) Consider the grammar given below.

$E \rightarrow E + T$

$E \rightarrow T$

$T \rightarrow T * F$

$T \rightarrow F$

$F \rightarrow (E)$

$F \rightarrow id$

Prepare SLR parsing table for the above grammar .Give the moves of SLR parser on id * id + id

OR

B) Consider the Following Grammar

$S \rightarrow CC$
$C \rightarrow cC/d$

Construct LALR Parsing Table for the above Grammar

14. A) Translate the expression a=b * -c + b * -c into quadruple, triple and indirect

OR

B) Compare the different storage allocation strategies?

15. A) Describe different principal sources of optimization techniques with suitable Examples?

OR

B) Demonstrate the different issues in the design of a code Generator?

Subject Code: R15A32CS01

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III - B.Tech II Semester End Examinations, October - 2020
Subject: Compiler Design
(Common to CSE & IT)

Time: 2 Hours   Max. Marks: 75

- **Answer any Five questions**   (5 X 15=75 Marks)

1. a) Illustrate different phases of compiler with how the transformation of input to
    output takes place in each phase.   10M
    b) Write about Lex.   5M

2. a) Compute FIRST and FOLLOW functions for the grammar given below   9M

    $E \rightarrow TE'$

    $E' \rightarrow +TE' \mid \varepsilon$

    $T \rightarrow FT'$

    $T' \rightarrow *FT' \mid \varepsilon$

    $F \rightarrow (E) \mid id$

    b) Consider the following grammar and draw parse trees for the strings   6M
    (i) 00101   (ii) 00011

    $S \rightarrow A \mid B$

    $A \rightarrow 0A \mid \varepsilon$

    $B \rightarrow 0BA \mid 1B \mid \varepsilon$

3. Construct the SLR (1) parsing table and parse the given string id+id*id   15M

    $E' \rightarrow E$

    $E \rightarrow E+T$

    $E \rightarrow T$

    $T \rightarrow T*F$

    $T \rightarrow F$

    $F \rightarrow (E)$

    $F \rightarrow id$

4. a) Discuss about different types of intermediate code generation with an example for
    each.   8M
    b) Describe briefly the data structures for symbol table.   7M

5. a) Show how optimization is done using principle sources of optimization with
    examples.   8M
    b) Describe about code generation algorithm.   7M

6. a) What is the role and need of Lexical Analyzer?   7M

    b) Consider the Grammar   8M
    E→E+E | E*E | (E) | id and parse the string id + id*id using shift reduce parsing.

7. a) Compare Top Down and Bottom Up parsers with example for each.   6M
    b) Describe briefly about syntax directed definitions (SDD).   9M

8. a) What are the problems in code generation?   5M
    b) Write about Peephole optimization techniques.   10M

Subject code: R12A32CS02

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III-B.Tech -II- Semester Supplementary Examinations, April 2017
Subject: COMPILER DESIGN
(Only for CSE)

Time: 3hrs   Max.marks:75

Section – A (Short Answer type questions)   (25 Marks)

- **Answer All the Questions:**

1. Construct Regular expressions for the following

   i) identifier ii) Constant.   3M

2. Justify "Multipass compiler is memory efficient than single pass"?   2M

3. Design a CFG for palindrome over an alphabet {a,b}*.   3M

4. Write structure of YACC.   2M

5. Construct Quadruple ,triple, indirected triple for a:=(b*-c)+(b*-c)   3M

6. Differentiate between S-attributed and L-attributed grammar.   2M

7. Explain about Activation Record in symbol table.   3M

8. List any three applications of DAG .   2M

9. What are the principles of Data-Flow analysis   3M

10. Differentiate between machine dependent and machine independent optimization. 2M

Section — B (Essay questions)

- Answer **All** questions, each question carries equal marks   **(5×10=50Marks)**

11. A) Explain the following.   10M

    i)Data Structures in compiler   ii) Bootstrapping

                                      OR

    B) Write LEX program for recognizing identifier, constant, keyword, operators and

    special symbols.   10M

12. A) Check whether the following grammar is LL(1) or not?   10M

    E →E+T |T

    T →T*F |F

    F→(E) | id

                                                                                    P.T.O

                                      OR

    B) Compute LALR parser for S→aAb |m A→ bS| n.   10M

13. A) Write SDT for converting binary number into decimal   10M
                                      OR
    B) Explain Type equivalence and Type conversion with example?   10M

14. A) Explain Block structure and non block structure storage allocation techniques.

                                                                                         10M
                                      OR
    B) Explain machine independent optimization techniques in detail?   10M

15. A) i) Explain about peephole optimization ii) Register allocation techniques.   10M
                                      OR
    B) Write Design issues of Code generator in detail?   10M

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III-B.Tech-I-Semester Supplementary Examinations, - 2019
Subject: Compiler Design
(Only for CSE)

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

Section – A (Short Answer type questions)   **(25 Marks)**

- **Answer all questions**

1. Construct Regular expressions for the following

   i) identifier ii) Constant.   3M
2. Differentiate between phases and passes   2M
3. Define Context Free Grammar. Give an example   3M
4. Give an example of abstract syntax tree.   2M
5. Define Ambiguous grammar with example?   3M
6. Compare SLR,LALR, CALR parsers   2M
7. Write briefly about symbol table.   2M
8. Give an example of frequency reduction and folding optimization technique.   3M
9. Write about the forms of object code.   3M
10. Differentiate between machine dependent and machine independent optimization   2M

Section – B(Essay Type questions)   **(5x10=50 Marks)**

- **Answer all questions, each question carry equal marks.**

11. A) Write LEX program for recognizing identifier, constant, keyword, operators and special symbols.   10M

    OR

    B) Explain the different phases of compiler and output of each phase with a neat diagram.   10M

12. A) Compute FIRST and FOLLOW functions for the grammar given below   10M

    $E \rightarrow TE'$

    $E' \rightarrow +TE' \mid \varepsilon$

    $T \rightarrow FT'$

    $T' \rightarrow *FT' \mid \varepsilon$

    $F \rightarrow (E) \mid id$

    and find whether the above grammar is LL (1) grammar or not.

    OR

    P.T.O

B) Construct the operator precedence parser for the following grammar   10M

$E \rightarrow EAE \mid (E) \mid \mid id$

$A \rightarrow + \mid - \mid * \mid / \mid \wedge$

and then parse the input id * (id ^ id) – id / id from the operator precedence relations.

13. A) Test whether the following grammar is LL(1) or not.

    $S \rightarrow AaAb \mid BbBa$
    $A \rightarrow \varepsilon$
    $B \rightarrow \varepsilon$ 10M

    OR

    B) Test whether the Grammar is SLR or not?   10M

    $E \rightarrow E + T \mid T$

    $T \rightarrow T * F \mid F$

    $F \rightarrow F \mid a \mid b$

14. A) i)Discuss about intermediate code generation

    ii) write three address code for the following code

    while (i<10)

    {

    x=0;

    i=i+1;

    }

    OR

    B) Discuss about data structure for symbol tables

15. A) Explain about optimization techniques with an example for each.   10M

    OR

    B) i) Write Design issues of Code generator in detail?   5M

    ii) Explain peephole optimization?   5M

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III B.Tech-II-Semester Supplementary Examinations, April/May-2022
Subject: Compiler Design
(Only for CSE)

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

Section – A (Short Answer type questions)

- **Answer all questions**   **(25Marks)**

1. Explain the role of Lexical Analyzer.   2M
2. Explain Input Buffering?   3M
3. List the rules for calculating FIRST.   2M
4. Consider the CFG {S→aABC , A→aB|C , B →bA|b ,C→a} find LMD for 'aababa'.   3M
5. Compare Top-down parsing and Bottom-up parsing   2M
6. Mention Different Bottom up Parsers?   3M
7. List the different Attributes of Symbol Table?   2M
8. Mention different kinds of intermediate representations   3M
9. Construct DAG for x=(a*b)+c*(a*b)+f\e.   2M
10. Generate the code for x: =x+1 for target machine?   3M

Section—B (Essay questions)

- **Answer all questions, each question carries 10 marks.**   **(5 x 10 =50 Marks)**

11. A) Explain the various phases of a compiler in detail. Also Write down the output
    for the following expression after each phase Position: =initial+ rate*60

                              OR

    B) Write a LEX Program to identify different kinds of tokens like keywords,
    operators ,identifiers, numbers of a C Language?

12. A) Construct Predictive Parsing Table for the following Grammar

    $E \rightarrow TE^1$

    $E^1 \rightarrow +TE^1/\varepsilon$

    $T \rightarrow F T^1$

    $T^1 \rightarrow * F T^1/\varepsilon$

    $F \rightarrow (E)/id.$

                              OR

    B) Consider the Following Grammar

                    $S \rightarrow aB \mid bA,$

                    $A \rightarrow a \mid aS \mid bAA,$

                    $B \rightarrow b \mid bS \mid aBB$

    Construct Left Most Derivation tree and Right Most Derivation Tree for the String
    w= aaabbabbba

                                                            P.T.O

13. A) Construct SLR parsing table for the following grammar

        $S \rightarrow AS \mid b$

        $A \rightarrow SA \mid a$

    and parse the string aabab

                              OR

    B) Consider the Following Grammar

                    $S^1 \rightarrow S$

                    $S \rightarrow CC$

                    $C \rightarrow cC/d$

    Construct LALR Parsing Table for the above Grammar

14. A) i) What are the contents of a Symbol Table? Explain in Detail?

       ii) Which data Structures used to implement a symbol Table in an efficient way?
           GiveReasons?

                              OR

    B) Compare the different storage allocation strategies?

15. A) Explain in Detail about Peep hole optimization

                              OR

    B) Demonstrate the different issues in the design of a code Generator?

ANURAG GROUP OF INSTITUTIONS

(Autonomous)

School of Engineering

III-B.Tech-II-Semester supplementary Examinations, November - 2017

Subject: Compiler Design

(CSE)

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

Section – A(Short Answer type questions)   (25Marks)

- **Answer all questions**

1. Explain the necessity of dividing compiler into front end and back end.   2M

2. Draw the finite automata for the following tokens

    i) Constant   ii) Identifier   3M

3. Calculate **Follow** of the following grammar   3M

    $S \rightarrow aAB \mid bBa$

    $A \rightarrow cSb \mid d$

    $B \rightarrow m$

4. What is meant by handle pruning?   2M

5. Compare SLR, CLR and LALR parser.   3M

6. Write and explain about different conflicts that are possible in SLR parser.   2M

7. Distinguish between S-attributed and L-attributed grammars?   2M

8. Compute Quadruple , Triple and indirected triple for **a=b*-c + d**   3M

9. Distinguish between machine dependent and independent optimization.   2M

10. Explain briefly about Register allocation techniques.   3M

Section — B (Essay questions)

- Answer **All** questions, each question carries equal marks   **(5×10=50Marks)**

11. A) Explain the translation process of compilation and with the instruction Success = Hardwork *10+Luck   10M

    OR

    B) i) Explain the Role of Lexical Analysis

    ii) Write Short notes on Input Buffering.   10M

12. A) i) Construct shift-reduce parser for **id+id*id** using the following CFG   5M

    $E \rightarrow E+E \mid E*E \mid id$

    ii) Explain ambiguous grammar with example   5M

    P.T.O

OR

B) Consider the following grammar   10M

$S \rightarrow iEtS \mid iEtSeS \mid a$
$E \rightarrow b \mid c$

Construct Predictive Parsing table and also check whether the given grammar is LL(1) or not?   10M

13. A) Consider the following grammar:

    $S \rightarrow BB \mid b$
    $B \rightarrow bB \mid a$

    Construct the CLR table for the grammar. Show the actions of the parser, for the input string "aba".   10M

    OR

    B) Given the grammar:

    $S \rightarrow L=R \mid R$
    $L \rightarrow *R \mid id$
    $R \rightarrow L$

    Construct **SLR** parsing table and check that whether given grammar is **SLR(1)** or not?   10M

14. A) What is a Symbol table? What are the contents of a Symbol table? Explain briefly the data structures for Symbol table.   10M

    OR

    B) Explain the following with example.   10M
    i) Synthesized attributes.
    ii) Inherited attributes.

15. A) i) Explain in detail about Design Issues of Code generator?   5M
    ii) Explain in detail about Peephole Optimization?   5M

    OR

    B) Explain the Following: 10M
    i) Local Optimization Techniques   ii) Loop Optimization Techniques.

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III B.Tech -I Semester Supplementary Examinations, November 2017
Subject: Compiler Design
(Only for CSE)

Time : 3 Hours   Max.Marks: 75

Section—A (Short answer type questions)

- Answer **All** questions   (25 Marks)

1.	Define Compiler and Cross compiler.	2M
2.	Write short notes on LEX Specifications.	3M
3.	What are the reasons to have Ambiguity in context free grammars list them?	2M
4.	Differentiate Top-Down parsing and Bottom-Up parser.	3M
5.	Explain the concept of LR parsing technique.	3M
6.	Define Closure of an Item.	2M
7.	Give the post fix notation of the expression ((A * B) + (C / D))	2M
8.	Define S-attribute and L-attributed definition.	3M
9.	Explain Reduction in strength with example.	3M
10.	What are different Addressing modes Available?	2M

Section –B

- **Answer All questions, each question carries equal marks**   **(5 x 10 =50 Marks)**

11. A) Explain the Phases of compiler with the example Position=initial+rate * 40.0 and
draw the diagram for output of each phase?   10M

OR

B) i) Define tokens, patterns and lexemes?   5M
   ii) Define Regular Expression and give the Regular Expression and transition
      diagram for Identifiers?   5M

12. A) Define the context free grammar? Consider the following Grammar

S →(L) |a

L→L, S|S

Construct left most derivation and parse trees for the following sentences   10M
   i)   (a, (a , a))
   ii) (a, ((a,a),(a,a)))

OR

P.T.O

B) Explain the rules to construct the FIRST and FOLLOW sets. Find the LL (1)
parsing table for the following grammar and state whether the grammar is LL (1)?

10M

S→iEtSS'|a
S'→eS|ε
E→b

13. A) Construct the LALR parsing table for following grammar?   10M
   S→CC
   C→cC | d

OR

B) Construct the DFA with canonical collection of items as states for the following
grammar and draw the SLR parsing table for the same grammar?   10M
   S→L=R
   L→*R|id
   R→L

14. A) i) Explain the Different Three-address statements?   5M
   ii) Construct the Triples, Indirect Triples and Quadruples for expression
      a*-(b+c)?   5M

OR

B) Explain the concept of Deep Access and Shallow access in detail with example.
                                                          10M

15. A) i) Define a Basic block. Explain the algorithm for Basic block   5M
   ii) Explain the Principal sources of optimization   5M

OR

B) Explain the Loop Optimization techniques with Example   10M

Subject Code: R14A31CS02

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III-B.Tech -I-Semester Supplementary Examinations, May - 2019
Subject: Compiler Design
(Only for CSE)

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

Section – A (Short Answer type questions)	(25 Marks)

- **Answer all questions**

1.	Distinguish Pass and Phase of a compiler.	2M
2.	Explain the following terms with an example	
	Token, Lexeme, Pattern	3M
3.	What is parsing? List different types of parsing techniques.	3M
4.	Define Operator grammar.	2M
5.	Differentiate between LR and LL parsers.	2M
6.	Explain about conflicts in LR(0) grammar	3M
7.	Explain the following in detailed	
	(i) S- attributed definitions (ii) L- attributed definition	3M
8.	Write three address code for the statement	
	(a*b)+(c-d)*(a*b)+b	2M
9.	What is copy propagation? Explain with an Example	3M
10.	Explain about various object code forms.	2M

Section — B (Essay questions)

- Answer **All** questions, each question carries equal marks   (5 x 10 =50 Marks)

11. A) i) What is regular expression? Write the regular expressions for the following

    I)   The set of all strings of 0's and 1's having odd number of 1's

    II)   Set of all strings of 0's and 1's beginning with 1or 0 and not having two
         consecutive 0's.   5M

    ii) Explain various phases of a compiler with a neat block diagram.   5M

                OR

   B) i) Write a LEX program to recognize Identifiers, Keywords, Operators.   5M

     ii) Write short notes on input buffering.   5M

12. A) i) What is left recursion. Eliminate the left recursion from the given grammar   5M

          A--> Ba | Aa | c

          B--> Bb | Ab | d

    ii) Explain about handling of ambiguous grammar in predictive passing.   5M

                OR

   B) i) Construct recursive decent parser for the given grammar   5M

          E--> TE'

          E'--> +TE' | ε

          T--> FT'

          T'--> *FT' | ε

          F--> (E) | id

    ii) Explain FIRST and FOLLOW rules   5M

P.T.O

13. A) Construct CLR parsing table for the given grammar

          S→ L=R | R

          L→ a | *R

          R→ L   10M

                OR

   B) Construct SLR parser for the following grammar

          E--> E+T | T

          T--> T* F | F

          F--> (E) | id   10M

14. A) i) Explain in brief the concept of syntax directed translation   5M

    ii) Write the quadruple, triple, indirect triple for the statement   5M

         a= b*-c + b *-c

                OR

   B) i) What is ordered and unordered symbol table? What is the function of symbol
      table in the compilation process?   5M

     ii) Write SDT for conversion from infix expression to Postfix expression   5M

15. A) i) Explain register allocation strategies with an example.   5M

    ii) What is loop optimization? Explain various techniques in loop optimization. 5M

                OR

   B) State and explain various machine dependant code optimization techniques.   10M

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III B.Tech I-Semester Supplementary Examinations, August-2022
Subject: Compiler Design
(Only for IT)

Time: 3Hours   Max Marks: 75

Section – A (Short Answer type questions)   (25Marks)

- **Answer all questions**

1. What is a Compiler?   2M
2. Outline Error-recovery actions in a lexical analyzer.   3M
3. Eliminate the ambiguity from the given grammar
   $$E \rightarrow E*E \mid E-E \mid E^\wedge E \mid E/E \mid E+E \mid (E) \mid id.$$ 3M
4. Construct a parse tree for the given string –(id*id) and the grammer is $E \rightarrow E*E \mid E-E$
   $\mid E+E \mid - (E) \mid id$ 2M
5. Compare Top down and bottom-up parsers.   2M
6. List out different types of LR parsers.   3M
7. Distinguish between synthesized and inherited attributes.   3M
8. List contents of an Activation Record.   2M
9. What is meant by Code Motion?   3M
10. Generate the code for x:=x+1 for target machine.   2M

Section—B (Essay questions)

- **Answer all questions, each question carries 10 marks.   (5 x 10 =50 Marks)**

11. A) For a source language statement x= y*z - 12, where x, y and z are float variables,
    * And – represents multiplication and subtraction on same data types, show and
    explain the input and output at each of the compiler phases.   10M

    OR

    B) i) Explain how the regular expressions and finite state automata are used for the
    specification and recognition of tokens?   7M
    ii) Discuss in brief about Lexical errors.   3M

12. A) Construct a predictive parsing table for the grammar
    E -> E + T / T, T -> T * F / F, F -> (E) /id.
    Verify whether the input string id + id * id is accepted by the grammar or not. 10M

    OR

    B) i) Discuss Context Free Grammar with suitable examples.   6M
    ii) Differentiate syntactic errors and semantic errors   4M

13. A) Construct the CLR parsing table for the grammar.
    S -> L = R / R, L -> * R / id, R -> L.
    Using the CLR table constructed check the acceptance of input string id=id/id and
    also explain the algorithm for this.   10M

    OR

    B) Write a note on the following
    i) Compaction of LR parsing tables with an example.   6M
    ii) Comparison of SLR, LALR and CALR parsers.   4M

14. A) What is a three-address code? Mention its types. How would you implement these
    address statements? Explain with suitable examples.   10M

    OR

    B) i) Write syntax directed translation for arrays.   5M
    ii) Explain in brief about Stack Storage allocation strategy.   5M

15. A) Demonstrate Loop optimization, Copy Propagation, Dead code elimination,
    Redundant sub expression elimination with suitable examples.   10M

    OR

    B) i) Write simple code generation algorithm.   4M
    ii) Explain the functional issues to be considered while generating the object code.
                                                                                    6M

ANURAG GROUP OF INSTITUTIONS
(Autonomous)
School of Engineering
III-B.Tech -I-Semester Supplementary Examinations, April - 2018
Subject: Compiler Design
(Only for CSE)

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

Section – A (Short Answer type questions) **(25 Marks)**

- **Answer all questions**

1. Find a regular expression for strings of 0s and 1s which has odd number of 0s and even number of 1s. **3M**
2. What are the functions of LEX tool? **2M**
3. Construct a parse tree for the string 00011 using the grammar **3M**
   $S \rightarrow A \mid B$
   $A \rightarrow 0A \mid \varepsilon$
   $B \rightarrow 0BA \mid 1B \mid \varepsilon$
4. What are syntactic and semantic phase errors. **2M**
5. Remove left recursion from the following grammar: **3M**
   $S \rightarrow Aa \mid b$
   $A \rightarrow Ac \mid Sd \mid e$

6. State ambiguous grammar. **2M**
7. What is symbol table? **2M**
8. Differentiate syntax tree and DAG with an example. **3M**
9. Write about object code forms? ? **2M**
10. What is constant folding and local optimization techniques? Give an example for each. **3M**

Section –B

- Answer **All** questions, each question carries equal marks **(5 x 10 =50 Marks)**

11. A) List the different phases of compiler and describe them with suitable example. **10M**

OR

B) i) Write about input buffering. **5M**
   ii) What are the role and functions of lexical Analyzer? **5M**

12. A) Test whether the following grammar is LL(1) or not. **10M**
   $S \rightarrow AaAb \mid BbBa$
   $A \rightarrow \varepsilon$
   $B \rightarrow \varepsilon$

OR

B) Construct the operator precedence parser for the following grammar **10M**
   $E \rightarrow E A E \mid (E) \mid \mid id$
   $A \rightarrow + \mid - \mid * \mid / \mid ^$
   and then parse the input id * (id ^ id) – id / id from the operator precedence relations.

P.T.O

13. A) Find the canonical collection of LR (0) items for the following grammar. **10M**

   $E' \rightarrow E$
   $E \rightarrow E+T$
   $E \rightarrow T$
   $T \rightarrow T*F$
   $T \rightarrow F$
   $F \rightarrow (E)$
   $F \rightarrow id$

OR

B) Test whether the Grammar is SLR or not? **10M**
   $E \rightarrow E + T \mid T$
   $T \rightarrow T *F \mid F$
   $F \rightarrow F \mid a \mid b$

14. A) Show how three address code types are implemented with an example for each. **10M**

OR

B) i) Describe symbol table organization using hash tables and show the symbol table organization for block structured language with example. **5M**
   ii) Draw syntax and DAG for the expression a + a * (b – c) + (b – c) *d **5M**

15. A) i) Write about different issues in the design of a code generator. **5M**
   ii) Explain principal sources of optimization techniques with an example for each. **5M**

OR

B) i) Write the algorithm for code generation. **5M**
   ii) Explain the following with suitable examples **5M**

   (a) Code motion
   (b) Induction variable elimination
   (c) Reduction in strength

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School of Engineering

III-B.Tech I Semester Supplementary Examinations, Oct / Nov - 2018

Subject: Compiler Design

(Only for CSE)

Time: 3hours   Max. Marks 75

SECTION - A (Short Answer type questions)   (25 Marks)

- Answer all questions.

1. Write the regular expression to describe the languages consists of strings made of even number of a's and odd number of b's.   2M
2. Describe the error recovery schemes in the lexical phase of a compiler.   3M
3. Write a context free grammar to represent palindromes.   3M
4. Define handle pruning.   2M
5. List out the conflicts during shift reduce parsing.   2M
6. Define Goto function in LR parser with an example.   3M
7. Give Syntax directed translation for case statement.   3M
8. List different data structures used for symbol table.   2M
9. Discuss constant folding with example.   3M
10. State the characteristics of Peephole optimization.   2M

Section – B (Essay Type questions)   (50 Marks)

- Answer all questions, each question carries equal marks.

11. A) Explain in detail the process of compilation. Illustrate the output of each phase of compilation of the input "b=(c+d)*(c+d)*2".   10M

OR

B) i) Write a short note on input buffering with neat sketch.   5M

    ii) Differentiate between lexeme, token and pattern with examples.   5M

12. A) i) Consider the following grammar and find FIRST and FOLLOW: 6M

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$
$A \rightarrow d$
$B \rightarrow d$

    ii) Explain the error recovery strategies in syntax analysis   4M

OR

P.T.O

B) Construct the predictive parser for the following grammar.

$S \rightarrow (L)/a$
$L \rightarrow L,S/S$

And also check the acceptance of the string (a,a,a) using parser table.   10M

13. A) Consider the following augmented grammar:

$S' \rightarrow S$
$S \rightarrow CC$
$C \rightarrow cC / d$

And construct the LALR parse table for the grammar.   10M

OR

B) Given the grammar:

$E \rightarrow TX$
$T \rightarrow (E) \mid int\ Y$
$X \rightarrow +E/\varepsilon$
$Y \rightarrow *T/\varepsilon$

Construct SLR Parsing table.   10M

14. A) i) Define synthesized and inherited attributes with examples.   5M

    ii) Draw the annotated parse tree for the expression (2+3) * (5+6).   5M

OR

B) Give the translation scheme for converting the assignments into three address code. Use the scheme for generating three address code for the assignment statement

g: = a+b-c*d.   10M

15. A) Discuss copy propagation and dead code elimination with examples.   10M

OR

B) Explain the code-generation algorithm in detail.   10M

ANURAG GROUP OF INSTITUTIONS
Autonomous
School of Engineering
III-B.Tech II-Semester Supplementary Examinations, Feb-2022
Subject: Compiler Design
(Common to CSE & IT)

Time: 3 Hours   Max Marks:75

Section – A (Short Answer type questions)
- **Answer all questions**   **(25Marks)**

1. What is advantage of sentinels in input buffering schemes?   2M
2. Difference between compiler and Interpreter.   3M
3. Define semantic errors with an example.   2M
4. Check whether the given grammar is ambiguous or not.   3M
   $S \rightarrow SS$
   $S \rightarrow a$
   $S \rightarrow b$
5. Compare top down and bottom up parsers.   2M
6. Construct LR parsing table for the given context free grammar   3M
   S–>AA
   A–>aA|b
7. Describe the purpose of intermediate codes.   2M
8. Discuss the importance of symbol table.   3M
9. Analyze loop optimization.   2M
10. Interpret peephole optimization.   3M

Section—B (Essay questions)
- **Answer all questions, each question carries 10 marks.**   **(5 x 10 =50 Marks)**

11. A) Discuss about lexical analysis with the following statement.   10M
    Suppose we pass a statement through lexical analyser.
    a = b + c;

    OR

    B) Explain the different phases of a compiler in detail.   10M

12. A) i) Construct a CFG for a language $L = \{wcwR \mid \text{where } w \in (a, b)^*\}$.   5M
    ii) Explain Syntactic phase errors   5M

    OR

    B) Construct the operator precedence parser for the following grammar   10M
    $E \rightarrow E A E \mid (E) \mid \mid id$
    $A \rightarrow + \mid - \mid * \mid / \mid ^$

    and then parse the input id * (id ^ id) – id / id from the operator precedence relations.

P.T.O

13. A) Construct LALR(1) parsing table for the grammar   10M
    $S \rightarrow AA$
    $A \rightarrow aA$
    $A \rightarrow b$

    OR

    B) Test whether the Grammar is SLR or not?   10M
    E -> E + T/T
    T -> T *F/F
    F -> F /a/b

14. A) i) Convert the expression a * – (b + c) into three address code   5M
    ii) Discuss data structures for symbol tables   5M

    OR

    B) i) Translate the following expression to quadruple   5M
    a + b x c / e ↑ f + b x c
    ii) Summarize representing scope information   5M

15. A) Discuss principal sources of optimization techniques with an example.   10M

    OR

    B) i) Write problems in code generation   5M
    ii) Explain register allocation and assignment   5M