31. a. Write in detail the design issues of a code generator.

(OR)

b. Construct DAG and optimal target code for the statement

```
i = 1, s = 0
while (i < = 10)
{
   s = s + a [i] [i];
   i = i +1
}
```

32. a. Explain various code optimization techniques in detail.

(OR)

b. What are the different storage allocation strategies? Explain

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Reg. No.															

B.Tech. DEGREE EXAMINATION, JUNE 2019
1st to 7th Semester

15CS314J – COMPILER DESIGN

(For the candidates admitted during the academic year 2015 - 2016 to 2017 - 2018)

Note:
(i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer **ALL** Questions

1. What is the output of lexical analyzer?
   (A) Parse tree (B) List of tokens
   (C) Intermediate code (D) Machine code

2. A grammar that produces more than one parse tree for same sentence is called
   (A) Ambiguous (B) Unambiguous
   (C) Regular (D) Irregular

3. Following context free grammar S→aB|bA, A→b|aS|bAA, B→b|bS|aBB generates strings of terminals that have
   (A) Equal number of a's and b's (B) Odd number of a's and odd number of b's
   (C) Even number of a's and b's (D) Odd number of a's and even number of a's

4. Positive closure of a language L is defined as
   (A) L^* (B) L^+
   (C) L (D) L^-

5. Which one of the following is a top down parser?
   (A) Recursive descent parsing (B) Operator precedence parsing
   (C) LR (k) (D) LALR (k)

6. Grammar of the program is checked at _____ phase of compiler.
   (A) Semantic analyzer (B) Syntax analyzer
   (C) Code optimization (D) Code generator

7. The grammar A→AA|IA|ϵ is not suitable for predictive parsing because the grammar is
   (A) Ambiguous (B) Left recursive
   (C) Right recursive (D) Operator grammar

8. An LALR(1) parser of a grammar 'G' can have SR conflicts if and only if
   (A) The SLR(1) parser for G has S-R conflicts (B) The LR(1) parser for G has S-R conflicts
   (C) The LR(0) parser for G has S-R conflicts (D) The LALR(1) parser for G has R-R conflicts

9. Consider the translation scheme shown below S→TR R→+T{print ('+');} R|∈ T→n{print (n.val);}. Here 'n' is a token that represents an integer and n.val represents the int.value. For an input string '9+5+2' this translation scheme will print.
   (A) 9+5+2 (B) 95+2+
   (C) 952++ (D) ++952

10. In a bottom up evaluation of a syntax directed definition, inherited attributes can
   (A) Always be evaluated (B) Be evaluated only if the definition is L attributed
   (C) Be evaluated only if the definition has synthesized attributes (D) Never be evaluated

11. Type checking is normally done using
   (A) Syntax directed translation (B) Lexical analysis
   (C) Code optimization (D) Syntax analysis

12. Which of the following is not an intermediate code form?
   (A) Postfix notation (B) Syntax trees
   (C) Three address codes (D) Quadruples

13. The graph that shows basic blocks and their successor relationship is called
   (A) Flow graph (B) DAG
   (C) Hamiltonian graph (D) Control graph

14. DAG representation of a basic block allows
   (A) Automatic detection of local common sub expression (B) Automatic detection of induction variables
   (C) Automatic detection of loop variant (D) Automatic detection of state variables

15. Which of the following is peephole optimization techniques?
   (A) Loop optimization (B) Local optimization
   (C) Constant folding (D) Dataflow analysis

16. A compiler for a high level language that runs on one machine and produce code for different machine is called
   (A) Optimizing compiler (B) One pass compiler
   (C) Cross compiler (D) Multipass complier

17. When a computer is rebooted, a special type of loads is executed called
   (A) Compiler and go loader (B) Boot loader
   (C) Bootstrap loader (D) Relocating loader

18. Which of the following symbols table implementation is based on the property of locality of reference?
   (A) Hash table (B) Search table
   (C) Self organizing list (D) Linear list

19. Reduction in strength means
   (A) Replacing runtime computation by compiler time computation (B) Removing loop variant computation
   (C) Removing common subexpression (D) Replacing a costly operation by a relatively cheaper one

20. Local and loop optimization in turn provide motivation for
   (A) Dataflow analysis (B) Constant folding
   (C) Peephole optimization (D) DFA and constant folding

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

21. How input buffering works in an lexical analyzer phase? Explain it with an example.

22. Define token, pattern, lexeme with example.

23. Compute the leading and trailing set for the following grammar
$E \to E+T \mid T, T \to T*F \mid F, F \to (E) \mid id$

24. Differentiate inherited and synthesized attribute with an example.

25. Construct three address code for $a = b + c * f * d - 1.0$.

26. Brief about cross compiler.

27. Differentiate "call by value" and "call by reference".

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

28. a. Explain the phases of compiler. Explain each phase using the statement $d = p * n * r / 100$.

(OR)

b. Construct DFA for the following regular expression $(a \mid b)^* abb$ and minimize it.

29. a. Consider the following grammar
$S \to L = R \mid R$
$L \to *R \mid id$
$R \to L$
Check whether the grammar is SLR(1) or not.

(OR)

b. Construct CLR parsing table for
$S \to AA$
$A \to aA \mid b$
And parse the string '*aaabaab*'.

30. a. What is three address code? Mention its types. How would you implement three address statements? Explain with an example.

(OR)

b. Explain the syntax directed translation for Boolean expressions.