30. a. Explain about back patching for procedure call.

(OR)

b. Describe the process of syntax directed translations of Boolean expression.

31. a. Discuss the various issues in design of code generation.

(OR)

b. Explain about PEEPHOLE optimization technique.

32. a.i. List out the various loop optimization techniques. (3 Marks)

ii. Write a short note on any four loop optimization technique with example. (9 Marks)

(OR)

b. Discuss in detail about different storage allocation strategies.

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Reg. No.														

B.Tech. DEGREE EXAMINATION, DECEMBER 2019
First to Eighth 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. The number of tokens in the following C statement is: printf("i=%d,&i=%x",i,&i);
   (A) 3 (B) 26
   (C) 10 (D) 21

2. In compiler, keywords of a language are recognized during
   (A) Parsing of the program (B) The lexical analysis of the program
   (C) The code generation (D) Data flow analysis

3. The lexical analysis for a modern computer language such as Java needs the power of which one of the following machine models in a necessary and sufficient sense?
   (A) Finite state automata (B) Deterministic pushdown automata
   (C) Non deterministic pushdown automata (D) Turing machine

4. What is the maximum number of moves that can be taken by a bottom up parser for a grammar with no epsilon and unit production to parse a string with 'n' tokens?
   (A) n/2 (B) n–1
   (C) 2n–1 (D) 2^n

5. Which of the following describes a handle as applicable to LR parsing.
   (A) It is the position in a sentential form where the next shift or reduce operation will occur
   (B) It is non terminal whose production will be used for reduction in next step
   (C) It is the terminal to be replaced
   (D) It is the production P that will be used for reduction in the next step along with a position in the sentential form of the production

6. The relation between NFA accepted language and DFA accepted language is
   (A) > (B) <
   (C) = (D) <=

7. In regular expression the operator '*' stands for
   (A) Iteration (B) Selection
   (C) Concatenation (D) Addition

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

9. Some code optimizations are carried out on the intermediate code because
   (A) Program analysis is more accurate on intermediate code than on machine code
   (B) The information from data flow analysis cannot otherwise be used for optimization
   (C) The information from the front end cannot otherwise be used for optimization
   (D) They enhance the portability of the compiler to other target processors

10. Which one of the following is false?
   (A) A basic block is a sequence of instructions where control enters the sequence at beginning and ends in exit
   (B) Available expression analysis can be used for common sub expression elimination
   (C) Live variable analysis can be used for dead code elimination
   (D) $x = 4 * 5 \Rightarrow x = 20$ is an example of common sub expression elimination

11. One of the purpose of using intermediate code in compiler is to
   (A) Make parsing and semantic analysis simpler (B) Improve error recovery and error reporting
   (C) Increase the changes of reusing the machine independent code optimizer in other compilers (D) Improve the register allocation

12. The process manager has to keep track of
   (A) Status of each program (B) Information to a programmer using the system
   (C) Both of the mentioned (D) Variable details of the program

13. Which loader function is accomplished by loader?
   (A) Reallocation (B) Allocation
   (C) Linking (D) Loading

14. Which one of the following features cannot be captured as CFG?
   (A) Syntax of if then else statement (B) Syntax of recursive procedures
   (C) A variable declared before its use (D) Matching nested parenthesis

15. The identification of common sub expression and replacement of run-time computations by compile time computations is
   (A) Loop optimizations (B) Local optimization
   (C) Constant folding (D) Data flow analysis

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

17. When a compiler is rebooted, a special type of loader is executed called
   (A) Compile and go loader (B) Boot loader
   (C) Bootstrap loader (D) Relative loader

18. Relocation bits used by relocations loader are specified by
   (A) Relocating loader itself (B) Linear
   (C) Assembler (D) Macro processor

19. Peep hole optimization is
   (A) Loop optimization (B) Local optimization
   (C) Constant folding (D) Data flow analysis

20. A bottom up parser generates
   (A) Right most derivation (B) Right most derivation in reverse
   (C) Left most derivation (D) Left most derivation in reverse

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

21. Define lexeme, token and pattern.

22. Write the algorithm for first and follow in parser.

23. Differentiate L-attribute and S-attribute.

24. Write three address code sequence for the assignment statement *d=(a–b)+(a–c)+(a–c)*.

25. List the types of system software.

26. Write a short note on copy propagation with example.

27. Define cross compiler with T-diagram.

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

28. a. Convert the regular expression *"ab(a+b)*"* to DFA and minimize it.

(OR)

b. Explain the phases of compiler with a neat sketch. Write down the output of each phase for the expression $a = b + c * 60$.

29. a. Construct a predictive parser table or the grammar.
$S \rightarrow (L) \mid a$
$L \rightarrow L, S \mid S$
And show whether the following string will be accepted or not *(a,(a,(a,a)))*.

(OR)

b. Consider the following grammar.
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow id$
Construct the SLR parsing table for the above grammar.