



Name: ..... Roll No.: .....

Branch: ..... Signature of Invigilator: .....

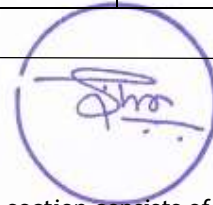
Semester: VIth

Date: 25/04/2022 (MORNING)

Subject with Code: CS305 COMPILER DESIGN

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: B.Tech

SEMESTER: VI

BRANCH: CSE

SESSION: SP/22

SUBJECT: CS 305 Compiler Design

TIME: 2hr

FULL MARKS: 50

**INSTRUCTIONS:**

1. Section A MCQ questions of 1 mark and total 30 marks.
2. Section B Subjective maximum of 20 marks.

**Section A**

1. If the lexical analyzer finds a token invalid, then
  - a) it generates an exception
  - b) it generates a warning
  - c) it generates an error
  - d) reads the whole program
2. The function \_\_\_\_\_ is automatically generated by the flex when it is provided with a .l file
  - a) flex()
  - b) yylex()
  - c) lex()
  - d) nnlex()
3. In the input file, In which section Anything written in this brackets is copied directly to the file lex.yy.c?
  - a) Rules Section
  - b) Definition Section
  - c) User Code Section
  - d) None of the above
4. Which symbol table implementation is based on the property of locality of reference?
  - a) Linear list
  - b) Search tree
  - c) Hash Table
  - d) Self-Organization

5. lexical analyzer is used to?
  - a) remove whitespace
  - b) removing comments
  - c) breaks these syntaxes into a series of tokens
  - d) All the above
6. Function of the syntax phase is to
  - a) build a uniform symbol table.
  - b) build a literal table and an identifier table.
  - c) parse the source program into the basic elements or tokens of the language.
  - d) recognize the major constructs of the language and to call the appropriate action routines that will generate the intermediate form or matrix for these constructs
7. 

```
int main ()  
{ integer x;  
return 0;  
}
```

which phase will throw error?
  - a) syntax phase
  - b) semantic phase
  - c) Machine dependent optimizer
  - d) lexical phase
8. From where it takes its input from
  - a) Lexical analyzer
  - b) Syntactic Analyzer
  - c) Semantic Analyzer
  - d) None of the mentioned
9. Which of these features of assembler are Machine-Dependent?
  - a) Instruction formats
  - b) Addressing modes
  - c) Program relocation
  - d) All of the mentioned
10. A compiler can check
  - a) Logical Error
  - b) Syntax Error
  - c) Both Logical and Syntax Error
  - d) Not Logical and Syntax Error
11. A system program that combines the separately compiled modules of a program into a form suitable for execution?
  - a) Assembler
  - b) Compiler
  - c) Linking Loader
  - d) Interpreter

12. Type checking is normally done during
  - a) Lexical Analysis
  - b) Syntax Analysis
  - c) Syntax Directed Translation
  - d) Code generation
13. By whom is the symbol table created?
  - a) Compiler
  - b) Interpreter
  - c) Assembler
  - d) None of the above
14. Semantic Analyzer is used for?
  - a) Generating Object code
  - b) Maintaining symbol table
  - c) Generating Object code & Maintaining symbol table
  - d) None of the above
15. What is the bottom-up parsing method also known as
  - a) Predictive parsing
  - b) Shift reduce parsing
  - c) Recursive descent parsing
  - d) None
16. Identify the method which merges the bodies of two loops
  - a) Constant folding
  - b) Loop unrolling
  - c) Loop jamming
  - d) None
17. Identify the most powerful parser?
  - a) LALR
  - b) SLR
  - c) Canonical LR
  - d) Operator precedence
18. Through which type of grammar can synthesized attributes can be simulated?
  - a) Ambiguous grammar
  - b) LR grammar
  - c) LL grammar
  - d) None
19. Another name of top-down parsing is?
  - a) Predictive parsing
  - b) Shift reduce parsing
  - c) Recursive descent parsing
  - d) None

20. Identify the technique used to replace run-time computations with compile-time computations.
- a) Code hoisting
  - b) Peephole optimization
  - c) Invariant computation
  - d) Constant folding
21. What is the role of optimizing the compiler?
- a) Optimized to take less time for execution
  - b) Optimize the code
  - c) Optimize to occupy less space
  - d) None
22. What is the compiler called which runs on one machine and produces code for a different machine?
- a) Optimizing compiler
  - b) One pass compiler
  - c) Cross compiler
  - d) Multipass compiler
23. What is the graph called which shows basic blocks along with their successor relationship?
- a) DAG
  - b) Control graph
  - c) Flowgraph
  - d) Hamiltonian graph
24. Why is handle pruning used?
- a) Canonical derivation sequence
  - b) Canonical reduction sequence
  - c) Both a and b
  - d) None
25. When can semantic errors be detected?
- a) During runtime
  - b) During compile time
  - c) Both a and b
  - d) None
26. What is the process of finding a parse tree for a string of tokens called?
- a) Tokenizing
  - b) Parsing
  - c) Analyzing
  - d) Recognizing

27. Which of the following can detect an error if a programmer by mistake writes multiplication instead of division?
- a) Interpreter
  - b) Compiler or interpreter test
  - c) Compiler
  - d) None of the mentioned
28. Which of the following system program forgoes the production of object code to generate absolute machine code and load it into the physical main storage location from which it will be executed immediately upon completion of the assembly?
- a) Two pass assembler
  - b) Load and go assembler
  - c) Macro processor
  - d) Linker
29. In activation record, Which of the following Stores the address of activation record of the caller procedure?
- a) Access Link
  - b) Actual Parameters
  - c) Control Link
  - d) Temporaries
30. Semantic analyzer attaches attribute information with AST, which are called?
- a) Analyzer attribute
  - b) Attributed AST
  - c) Analyzer AST
  - d) AST

## Section-B

31. Write name of two cousins of Compilers and its tasks performed. Give suitable example, describe how cousins of compilers you have mentioned are different from a simple compiler. [Marks-4]

32. Consider the following grammar:

Non-terminals {S, A}

Terminals {a, b}

Production rules:

$S \rightarrow T$

$T \rightarrow Ta \mid Tb \mid a$

Starting symbol is 'S'.

Construct SLR parsing table for this grammar. List out all conflicts which are present in the designed SLR parsing table? [Marks-4]

33. Show that the following grammar is LALR(1) but not LR(0).

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow d$

[Marks-4]

34. Consider the following grammar

$D \rightarrow TL$

$T \rightarrow \text{int} \mid \text{float}$

$L \rightarrow L_1, \text{id} \mid \text{id}$

Write corresponding semantic action for each of the Non-Terminal and then construct the annotated parse tree for the input expression: float a, b, c, d [Marks-4]

35. Consider the statement:

**while a < b do**

**if c < d then**

    x:=y+z

**else**

    x:=y-z

Show the annotated parse tree and the intermediate code generation process. [Marks-4]

**OR**

Explain the following with suitable examples:

(i) Loop Fission (ii) Loop Interchange (iii) Loop Reversal (iv) Loop Splitting

[Marks-4]

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