BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-DS-2022
Course Name – Compiler Design
Course Code - PCC-CSD504
(Semester V)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)   1 x 15=15
1.   *Choose the correct alternative from the following :*

(i)   Identify the statement that suitably describe the Cross-compiler.

a) Which is written in a different language from the source language
b) That generates object code for the machine it's running on.
c) Which is written in the same language as the source language
d) That runs on one machine but produces object code for another machine

(ii)   Identify the Lexemes from the following.

a) Identifiers
b) Constants
c) Keywords
d) All of the mentioned

(iii)   Choose the correct characteristic of LALR(1) grammars.

a) LALR(1) parsers have more states than LR(1) parsers
b) LALR(1) parsers are less powerful than SLR(1) parsers
c) LALR(1) parsers combine states to reduce the number of states in LR(1) parsers
d) LALR(1) parsers cannot handle shift-reduce conflicts

(iv)   Identify the string from the following that can be generated by the grammar S->aS/bA, A->d/ccA

a) aabccd
b) adabcca
c) abcca
d) abababd

(v)   Determine the output form of intermediate code.

a) Postfix notation
b) Syntax Trees
c) Three Address code
d) All of the mentioned

(vi)   Identify the input to code generator.

a) Source code
b) Intermediate code

c) Target code

d) All of the mentioned

(vii) Determine the value of synthesized attribute for a parse tree node depends on.

a) Attributes at the siblings only

b) Attributes at parent node only

c) Attributes at children nodes only

d) None of the mentioned

(viii) Identify the system program that loads an executable program in the main memory for execution.

a) Assembler

b) Linker

c) Loader

d) Text editor

(ix) Identify the process that identifies common sub-expression and replaces run-time computations by compile-time computation.

a) Local optimization

b) Loop optimization

c) Constant folding

d) Data flow analysis

(x) Select the correct statement that applies to a relocatable program form.

a) The absolute memory address of the program

b) The size of the program in memory

c) The ability to execute at any memory location

d) All of the mentioned

(xi) Determine the best way to compare different implementations of a symbol table.

a) Compare the time required to add a new entry

b) Compare the time required to delete an existing entry

c) Compare the time required to retrieve an entry

d) All of the these

(xii) Identify the primary advantage of generating intermediate code in a compiler.

a) It allows for faster compilation

b) It simplifies syntax analysis

c) It enables machine-independent optimization

d) It directly generates executable code

(xiii) Select the phase of compilation where the source code is converted into tokens.

a) Semantic Analysis

b) Lexical Analysis

c) Code Optimization

d) Parsing

(xiv) Identify the phase that removes unreachable code and redundant computations.

a) Lexical Analysis

b) Parsing

c) Code Optimization

d) Semantic Analysis

(xv) Identify the type of language recognized by a push-down automaton

a) Regular languages

b) Context-free languages

c) Context-sensitive languages

d) Recursive languages

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Explain Ambiguous grammar with an example. (3)

3. Describe the representation of 3-address code with an example. (3)

4. Describe the phases of compilation in a typical compiler design. (3)

5. Write short notes to describe pass and phases of a compiler (3)

6. Explain with an example 'Flow Graph'. (3)

OR

Explain Dependency graph with an example (3)

Group-C

(Long Answer Type Questions)   5 x 6=30

7. evaluate the first and follow functions for the given grammar- S → aBDh B → cC C → bC / ∈ D   (5)
   → EF E → g / ∈ F → f / ∈

8. show the LL(1) parsing table for the following production rule: (5)
   E --> TE'
   E' --> +TE' | ε
   T --> FT'
   T' --> *FT' | ε
   F --> id | (E)

   *ε denotes epsilon

9. Justify with an example the term "ambiguity" in a grammar.   (5)

10. Describe the various phases of a compiler in detail. Also write down the output for the   (5)
    following expression: position: =initial+ rate * 60

11. Explain loop optimization with suitable example.   (5)

12. Evaulate the first and follow functions for the given grammar- S → ACB / CbB / Ba A → da / BC (5)
    B → g / ∈ C → h / ∈

                                    OR

    Estimate the first and follow functions for the given grammar- S → A A → aB / Ad B → b C → g (5)

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