17432

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-DS-2022/B.Tech.(CSE)-AIML-2023/B.Tech.(CSE)-DS-2023/B.Tech.(CSE)-2023
Course Name – Compiler Design
Course Code - PCC-CSM504/PCC-CSD504/PCC-CSG504
(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 strings is not generated by the following grammar? S → SaSbS|ε

a) aabb b) abab
c) aabaab d) aaabbb

(ii) Select the true statement regarding Dead State?

a) It cannot be reached anytime b) There is no necessity of the state
c) If control enters no way to come out from the state d) If control enters FA deads

(iii) Choose the output file of Lex is explained __________. Given the input file is Myfile.

a) Myfile.e b) Myfile.yy.c
c) Myfile.lex d) Myfile.obj

(iv) Choose the grammars that can be translated to DFAs is __________

a) Left linear grammar b) Right linear grammar
c) Generic grammar d) All of the mentioned

(v) Select the grammar rules that violate the requirements of an operator grammar? (i) P -> QR (ii) P -> QsR (iii) P -> ε (iV) P -> QtRr

a) (i) only b) (i) and (iii) only
c) (ii) and (iii) only d) (iii) and (iv) only

(vi) Select a bottom up parser generates __________

a) Rightmost Derivation b) Right most derivation in reverse
c) Left most derivation d) Left most derivation in reverse

(vii) Choose the synthesized attribute is employed as an attribute whose value at 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) The best way to compare the different implementations of the symbol table is to compare the time required to ____________

a) Add a new name
b) Make an enquiry
c) Add a new name and make an enquiry
d) All of the mentioned

(ix) Select the true statements. (i) A programming language option does not permit global variables of any king and has no nesting of procedures/functions, but permits recursion can be implemented with static storage allocation (ii) Multi-level access link (or display) arrangement is needed to arrange activation records-only if the programming language being implemented has nesting of procedures/function (iii) Recursion in programming languages cannot be implemented with dynamic storage allocation (iv) Nesting of procedures/functions and recursion require a dynamic heap allocation scheme and cannot be implemented with a stack-based allocation scheme for activation records (v) Languages which permit a function to return a function as its result cannot be implemented with a stack-based storage allocation scheme for activation records.

a) (ii) and (v) only
b) (i), (iii) and (iv) only
c) (i), (ii) and (v)
d) (ii), (iii) and (v) only

(x) Identify in a Two-Pass assembler that the object code generation is done during.

a) Second pass
b) First pass
c) Zeroth pass
d) Not done by assembler

(xi) Identify the Lex compiler generates ____________.

a) Lex object code
b) Transition tables
c) Tokens
d) None of the mentioned

(xii) In the context of lexers generated by tools like flex, ______________ is the primary purpose of a regular expression.

a) To define the syntax of programming languages
b) To specify how to perform semantic analysis
c) To recognize and tokenize input strings
d) To generate abstract syntax trees (ASTs)

(xiii) Choose the primary role of a parser generator like Yacc or Bison in compiler construction.

a) Generating code for lexical analysis
b) Constructing abstract syntax trees (ASTs)
c) Optimizing code for execution speed
d) Handling input validation

(xiv) Select which is NOT typically part of the grammar specification while using yacc or bison.

a) Production rules
b) Operator precedence
c) Lexical token definitions
d) Error recovery mechanisms

(xv) In the context of parser generators, the purpose of the "reduce" action in a parsing table is ________________.

a) To shift the input to the stack
b) To push symbols onto the stack
c) To pop symbols from the stack and apply a production rule
d) To perform error recovery

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Identify the role of loader and linker in compilation process. (3)
3. Discuss the importance of regular expressions. (3)
4. Sketch the differences between SLR, CLR, LALR parsers? (3)
5. Explain the working of parser generator (YACC). (3)
6. Define Dead-code elimination with example. (3)

OR

Write global common subexpression elimination algorithm with an example. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the differences between the NFA and DFA? (5)
8. Examine about the equivalence of type expressions with examples (5)
9. Deduce a DAG stepwise from the following three address statement: (5)

   S1:= 4 * i
   S2:= a[S1]
   S3:= 4 * i
   S4:= b[S3]
   S5:= s2 * S4
   S6:= prod + S5
   Prod:= s6
   S7:= i+1
   i := S7

   if i<= 20 goto (1)

10. Explain loop optimization with suitable example. (5)
11. Construct CLR parse table for S->L=R/R, R->L, L->*R/id (5)

12. Evaluate the following expression: (a +b) * (c + d) + (a + b + c) into the form of a)Quadruples b) Triples (5)

OR

Evaluate quadruple, triples for the following expression: a +a*(b-c)+(b-c)*d? (5)

****