(7 pages)   Reg. No. : ....

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M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2023.

Second Semester

Computer Science with Artificial Intelligence — Core

COMPILER DESIGN

(For those who joined in July 2021 – 2022 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. What is a compiler? ———————.
   (a) Converts instructions to Machine Language
   (b) Converts Machine Language to high level language
   (c) Converts Machine Language to Assembly language
   (d) None

2. Which of the following is a stage of Compiler Design? ———————.
   (a) Semantic Analysis
   (b) Intermediate Code Generator
   (c) Code Generator
   (d) All of the mentioned

3. Which of the following is a part of a compiler that takes as input a stream of characters and produces as output a stream of words along with their associated syntactic categories?
   (a) Optimizer   (b) Scanner
   (c) Parser   (d) None

4. Which of the following derivations does a top-down parser use while passing an input string? ———————.
   (a) Leftmost derivation
   (b) Right most derivation
   (c) Both (a) and (b)
   (d) None

5. When can semantic errors be detected? ———————.
   (a) During runtime
   (b) During compile time
   (c) Both (a) and (b)
   (d) None

6. Which of the following component is important for semantic analysis? ———————.
   (a) Lex   (b) Symbol table
   (c) Yacc   (d) Type checking

7. ——————— is a tool that depicts the structure of basic blocks, helps to see the flow of values flowing among the basic blocks and offers optimization too.
   (a) Parser   (b) Scanner
   (c) DAG   (d) None

8. ——————— is the activity of filling up the unspecified information of labels by using the approximate semantic expression in during the code generation.
   (a) Type checking   (b) Back patching
   (c) Both (a) and (b) (d) None

9. Dead code plays no role in any program operation and therefore it can simply be eliminated.
   (a) True
   (b) False
   (c) Can be true or false
   (d) None

10. Peep-hole optimization is a form of ———————.
    (a) Loop optimization
    (b) Local optmization
    (c) Data flow analysis
    (d) Constant floding

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define the terms: Assembler, NFA, DFA.

    Or

    (b) Define sentinels. Why it is used?

Scanned with OKEN Scanner

12. (a) How do you say a grammer is ambiguous? Give an example.

Or

(b) Compute first and follow for the following grammer.

$$S \rightarrow (L)/a$$
$$L \rightarrow SL'$$
$$L' \rightarrow, SL'/ \in$$

13. (a) Give a brief note on synthesized attribute.

Or

(b) Write short note on dependency graph.

14. (a) What are the three types of three address statements available? Explain any one.

Or

(b) Consider the following piece of 'C' program into three address code.

```
if (a<b)
    c = a+b;
else
    c = a–b;
    d = c;
```

15. (a) Give a brief note on simple code generator.

Or

(b) Write down the algorithm for partitioning of three address statements in Basic blocks.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) With neat diagram, explain the phases of compiler.

Or

(b) How would you set a NFA from a regular expression? Obtain NFA for the regular expression. $(a/b)*abb$.

17. (a) Construct predictive parsing table for the following grammar and check whether the string (a, a, a) is accepted or not.

$$S \rightarrow a|\uparrow|(T)$$
$$T \rightarrow T, S|S$$

Or

(b) What is Top down parsing? Explain.

18. (a) Discuss in detail about L attributed definitions.

Or

(b) Write short note on syntax Directed Translation.

19. (a) Discuss in detail about Back patching.

Or

(b) What is the syntax of switch – case statement? Explain syntax directed translation of case statements.

20. (a) List out and explain the issues in the design of a code generator.

Or

(b) Define Flow graph. How to represent basic block?

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