## M.Sc.(CS) (Sem-II)          March-2023

## Computer Science : Paper II - Design & Implementation of Modern Compilers.

**Time : 2½ Hours**                                              **Marks : 75**

N. B
1) All Questions are Compulsory
2) Figures to the right indicate Marks
3) Illustration, depth answers and diagrams will be appreciated
4) Mixing of sub-questions is not allowed
5) Each Question carries 5 Marks

**Q.1      Attempt any Three of the Following:**                              **15 Marks**
a) What is the difference between compiler and interpreter?
b) What are the phases/structure of compiler?
c) Explain applications of compiler?
d) List out and explain the parts of string?
e) Explain DFA and NFA?
f) Differentiate between Recursive descent and Predictive parser?

**Q.2      Attempt any Three of the Following:**                              **15 Marks**
a) Describe the language denoted by the R.E. (0/1)*0(0/1)(0/1).
b) Explain the steps of lexical analyzer?
c) Explain Parsers and its types?
d) What is parse tree? And explain with example
e) What is regular expression and give example.
f) Write down the operations on languages?

**Q.3      Attempt any Three of the Following:**                              **15 Marks**
a) Write down the rules for R.E?
b) Explain the types of top-down parser?
c) Explain bottom-up parser?
d) What are inherited and synthesized attributes?
e) Explain Loop Optimization
f) What are implementation scheme of syntax directed translation?

**Q.4      Attempt any Three of the Following:**                              **15 Marks**
a) Differentiate between L-attributed and S-attributed SDT.
b) How compiler checks declarations and expressions in a program?
c) How local variables are managed during function calls?
d) What are blocks and traces?
e) Write short note on liveness of variables using Tiger compiler.
f) Explain Tokens, Patterns and Lexemes

**Q.5** **Attempt any Three of the Following:** **15 Marks**

a) Consider the grammar

S → aB | bA

A → a | aS | bAA

B → b| bS | aBB

For the string w = aabbabab, find

1. Leftmost derivation

2. Rightmost derivation

3. Parse Tree

b) Construct Regular expression for the language L= {w ε{1,0}/w

c) Write the R.E. for the set of statements over {x, y, z} that contain an even no of x's.

d) Explain Finite Automata.

e) Explain Predictive Parser Algorithm

f) Explain Context Free Grammer

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