

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022
(Regular/Improvement/Supplementary)

COMPUTER SCIENCE
FCSS3C13-PRINCIPLES OF COMPILERS

Time: 3 Hours

Maximum Weightage: 30

Section A: Short answer questions. Answer any *four* questions. Each carries *two* weightage.

- 1 Describe the type checking of functions.
- 2 Define Ambiguous Grammar. Check whether the grammar $S \rightarrow aAB$, $A \rightarrow bC/cd$, $C \rightarrow cd$, $B \rightarrow c/d$, is Ambiguous or not.
- 3 Construct a Finite Automaton for the Regular Expression $(00+11)^*$.
- 4 Define Intermediate code generator. Explain in brief about different forms of Intermediate code generation.
- 5 What is static allocation strategy? What are its limitations?
- 6 Find the FIRST and FOLLOW of the non-terminals in the grammar

$S \rightarrow aABe$

$A \rightarrow Abc|b$

$B \rightarrow d$

- 7 What is the role of regular expression in lexical analysis? Explain with examples.

(4 × 2 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

- 8 How do we implement lexical analyzer? Explain with example.
- 9 Construct NFA for the following regular expression $R = (a|b)^*abb$
- 10 Explain how DAG will help in intermediate code generation. Construct a DAG and a three address - code for the expression $a + a * (b-c) + (b-c) * d$.
- 11 Explain various ways to access non local variables.
- 12 Differentiate between top down and bottom up parsing techniques.
- 13 Describe about type expressions.
- 14 Explain static allocation and heap allocation strategies.

(4 × 3 = 12 weightage)

(P.T.O.)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

- 15 Explain the principal sources of optimization.
- 16 What is Activation Record? Explain its usage in stack allocation strategy. How is it different from heap allocation?
- 17 Write the code generation algorithm. Using this algorithm generate code sequence for the expression $x = (a - b) + (a + c)$.
- 18 Explain the algorithm to minimize the number of states of DFA with example.

(2 × 5 = 10 weightage)