INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech V Semester End Examinations (Regular), February – 2021

Regulation: IARE–R18

COMPILER DESIGN

Time: 3 Hours   (Common to CSE | IT)   Max Marks: 70

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. Explain language processing system with neat diagram. **[5M]**

2. Explain context free grammar with examples. **[5M]**

3. Write short notes about syntax directed translation. **[5M]**

4. Elucidate in detail about type systems and type expression. **[5M]**

5. Explain principal sources of optimization with examples. **[5M]**

6. How lexical analyzer is constructed using lex? Give an example. **[5M]**

7. Give informative notes on shift reduce parser. Differentiate SLR, CLR, and LALR parser. **[5M]**

8. Write a short notes on abstract syntax tree. **[5M]**

PART – B

9. Show how the DFA is directly converted from an augmented regular expression (a/b)*abb. **[10M]**

10. Solve the given regular expression using Thompson construction
    i)(a/b)*abb
    ii)$(0/\epsilon).(o/1)*0$ **[10M]**

11. Design a predictive parsing table for the grammar.
    E →E+T
    T→T*F
    F→(E)/id and shows the moves for the input string id+id*id. **[10M]**

12. Check whether the following grammar is SLR or not. Explain your answer with reasons.
    S→L=R | R
    L→*R | id
    R→L **[10M]**

13. Translate the following expression to quadruple, triple and indirect triple-
    a = b x – c + b x – c.

    [10M]

14. Suppose that we have a production A→BCD A→BCD. Each of the four non terminals A,B,C,A,B,C, and DD have two attributes: s is a synthesized attribute, and i is an inherited attribute. For each of the sets of rules below, tell whether

    i) the rules are consistent with an S-attributed definition

    ii) the rules are consistent with an L-attributed definition, and

    iii) whether the rules are consistent with any evaluation order at all

    a. A.s=B.i+C.s.A.s=B.i+C.s.

    b. A.s=B.i+C.sA.s=B.i+C.s and D.i=A.i+B.s.D.i=A.i+B.s.

    c. A.s=B.s+D.sA.s=B.s+D.s

    d. A.s=D.i,B.i=A.s+C.s,C.i=B.s,A.s=D.i,B.i=A.s+C.s,C.i=B.s, and D.i=B.i+C.i.D.i=B.i+C.i. **[10M]**

15. Develop a quicksort algorithm for reads nine integers into an array a and sorts them by using the concepts of activation tree. **[10M]**

16. Explain the specification of simple type checker for statements, expressions and functions. **[10M]**

17. Explain the following with respect to code generation phase. i) Input to code generator ii) Target program iii) Memory management iv) Instruction selection v) Register allocation vi) Evaluation order **[10M]**

18. Construct the DAG for the following Basic block & explain it.

   i) S1:= 4 * i

   ii) S2:= a[S1]

   iii) S3:= 4 * i

   iv) S4:= b[S3]

   v) S5:= s2 * S4

   vi) S6:= prod + S5

   vii) Prod:= s6

   viii) S7:= i+1

   ix) i := S7

   if i<= 20 goto (1) **[10M]**

$- \circ \circ \bigcirc \circ \circ -$