Daffodil International University

Department of Computer Science and Engineering
Faculty of Science and Information Technology
Final Examination, Semester: Fall 2017

Course Code: CSE331 **Course Title: Compiler Design** **Time: 2:00 hrs.**
Course Teacher: All **Section: All** **Campus: All** **Total Marks: 40**

Answer all the questions

a) Write the rules for finding first and follows. 3

b) Find First and Follow from the following production rules and construct LL(1) table: 7

S → ABCD
A → x | Cb | ε
B → y | dA | ε
C → z | f

a) How Code optimization helps program in general and in terms of compilation? What are the techniques for Code Optimization? 4

b) Produce LR(0) automation and Canonical table from the following grammar. 6

E->E+T|T
T->T*F|F
F->id | (E)

a) Show the syntax tree and directed acyclic graph for the expression: 4

$$(p + q) * (p - q) + (p + q) + (p - q)$$

b) For the expression stated in question *3(a)* produce 6

i. **Quadruples data structure** *and*
ii. **Triples data structure.**

a) The following Three-address code is to implement the Quicksort algorithm. Produce the Basic block and Flow graph from the following intermediate code. 6

1. i = m-1
2. j = n
3. t1 = 4 * n
4. v = a[t1]
5. i = i+1
6. t2 = 4 * i
7. t3 = a [t2]
8. If t3<v goto (5)
9. j = j -1
10. t4 = 4 * j
11. t5 = a[t4]
12. if t5>v goto (9)
13. if i>=j goto (23)
14. t6 =4 * i
15. x = a[t6]
16. t7 = 4 * i
17. t8 = 4 * j
18. t9 = a[t8]
19. a[t7] = t9
20. t10 = 4 * j
21. a[t10] = x
22. goto (5)
23. t11 = 4 * i
24. x = a[t11]
25. t12 = 4 * i
26. x = a[t11]
27. t12 = 4 * i
28. a[t12] = t14
29. t15 = 4 * n
30. a[t15] = x

b) What is the role of Leader in Basic Block? Write the procedure of determining leader for basic blocks. Why Basic Block is used? 4

----- Good luck ☺ -----