Tribhuwan University
Institute of Science and Technology
2076

Bachelor Level / sixth-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC365)** Pass marks: 24 (Compiler Design and Construction) Time: 3 hours Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions. (10x6=60)

1. Explain briefly about different phases involved in the compiler, with a block diagram.

2. Given a regular expression (ε + 0)*10. Construct the DFA recognizing the pattern described by this regular expression using syntax tree based reduction.

3. What is shift reduce parsing techniques? Show shift reduce parsing action for the string (x+x)*a, given the grammar

$$S \rightarrow S+S \mid S*S \mid (S) \mid x$$

4. Construct an SLR parsing table for the following grammar.

S -> aAa | bAb | ba

5. Define Syntax directed definition. Construct annotated parse tree for the input expression (5*3+2)*5 according to the following syntax directed definition.

Production	Semantic Rule
L -> En	Print E.val
E -> E_1 + T	E.val -> E_1.val + T.val
E -> T	E.val ->T.val
T -> T_1 * F	T.val -> T_1.val * F.val
T -> F	T.val -> F.val
F -> (E)	F.val -> (E.val)
F -> digit	F.val -> digit.lexval

6. Write Syntax Directed Definition to carry out type checking for the following expression.

E -> id | E1 op E2 | E1 relop E2 | E1[E2] | E1 ↑

7. Explain with examples about different methods of intermediate code representation.

8. What is the purpose of code optimization? Explain different types of loop optimization techniques with examples.

9. Discuss about different factors affecting the process of target code generation.

10. Discuss the importance of error handlers in the compiler. How is it manipulated in the different phases of compilation?