POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Compiler Design

Semester: Spring

Year : 2025
Full Marks : 100
Pass Marks : 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

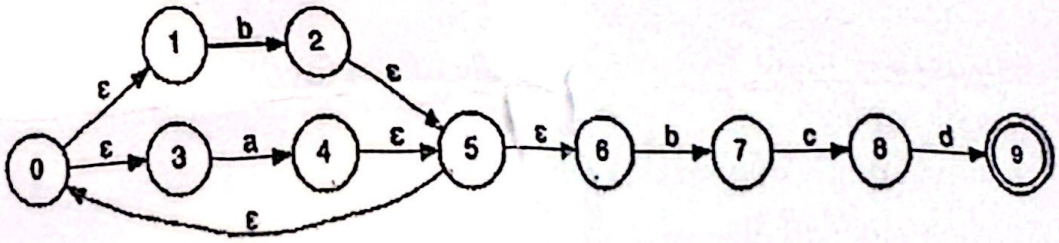
Attempt all the questions.

1. a) Define compiler. Explain the phases of a compiler with a detailed block diagram. 7

b) Write code generation algorithm. Consider a statement x = (a-b)+(e+(c-d)) and perform simple code generation. 8

2. a) What are the functions of a lexical analyzer? Explain with suitable examples. How lexical analyzer use symbol table? 7

b) Convert following NFA to DFA using Subset Construction. 8



3. a) Construct an LR(1) parsing table for the following grammar: 8

$S' \rightarrow S$

$S \rightarrow C\ C$

$C \rightarrow c\ C$

$C \rightarrow d$

OR

Consider the following grammar for arithmetic expressions:

$E \rightarrow T\ E'$

$E' \rightarrow +\ T\ E' \mid \varepsilon$

$T \rightarrow F\ T'$

$T' \rightarrow *\ F\ T' \mid \varepsilon$

$F \rightarrow (\ E\ ) \mid id$

Construct the LL(1) parsing table.

b) How does Recursive Descent Parsing works? Consider the following grammar 7

$S \rightarrow cAd$

$A \rightarrow ab|a$

Parse the string ***cad*** using recursive descent parser.

4. a) What is the significance of symbol tables in compilers? Explain the role of hash tables in building a symbol table. 7

b) What is the need of intermediate code optimization? Discuss the different types of Graphical IRs used in compilers. 8

5. a) Discuss the concept of Register Allocation and Assignment in code generation. 8

OR

Explain the major issues in the design of a code generator.

b) Convert regular expression (a|b)*abb to NFA using Thompson's Construction and then perform NFA to DFA conversion. 7

6. a) What are the principal sources of optimization in compiler design? Explain with examples. 7

b) Discuss Data-Flow Analysis in detail. How are Data-Flow Equations solved? 8

7. Write short notes on: **(Any two)** 2×5

a) Mapping Values to Names

b) Control Flow Graph

c) Closure properties of REs