DO Arun Kr Yadav (56) 01/12/2022 (2)

National Institute of Technology Hamirpur

End Semester Examination

B.Tech. CSE/Dual Degree, 5^{th} Semester

Compiler Design (CS-313)

Time: 02 : 30 PM–05 : 30 PM **Date:** 01/12/2022
Duration: 3.0 Hours **Max. Marks:** 50

Note: Answer all questions and each question having equal marks.

1. (a) Draw the Block diagram and explain the various phases of the compiler with suitable example. **[05 marks]**

   (b) Explain the use of symbol table in compilation process. List out the basic operations use for implementing the symbol table. **[05 marks]**

2. (a) Construction of a DFA for the set of string over {a, b} such that length of the string $|w| <= 2$ i.e, length of the string is atmost 2. **[05 marks]**

   (b) Let there be a Context Free Grammar denoted by G, for which the production rules are given below:- **[05 marks]**

   S → aB | bA
   A → a | aS | bAA
   B → b | bS | aBB

   Drive the string aaabbabbba using Left Most Derivation and Right most Derivation from the above grammar also check whether the grammar is ambiguous or not.

3. Check whether the following grammars G1 and G2 listed below are LL(1) or not, Justify your answer. **[10 marks]**

   G1: S → A | a A → a

   G2: S → (L) | a L → SL' L' →)SL' | ∈

4. (a) Draw the syntax tree and DAG for the following expression: **[05 marks]**
   $(a * b) + (c - d) * (a * b) + b$

   (b) Write a Three-Address code for the given expression and construct the flow diagram using Basic Block. **[05 marks]**

   if $((a + b) < (c + d))$ || $((e == f)$ && $(g > (h - k)))$
   then
   {
   $p = b * (-c) + b * (-d)$
   }
   else
   {
   $q = (-b) * (-b)$
   }
   $r = (-h) * (-k)$

5. Write a short notes on the following with example. **[10 marks]**

   (a) Dead code elimination
   (b) Intermediate Code Representation Techniques
   (c) Differentiate Compiler, Interpreter
   (d) Loader/Linker
   (e) Strength Reduction