Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Department of Computer Science and Engineering

B E- COE, CSE (VII Semester) MST	Course Code: UCS802 Course Name: Compiler Construction
September 26, 2022 10:30	
Time: 2 Hours, M. Marks: 35 Weightage: 25	Name Of Faculty: Karun Verma, Sunita Garhwal, Avadh Kishor, Rupali Bhardwaj, Rohit Ahuja

Note: ***Attempt all questions with proper justification. Assume missing data, if any, suitably.***

Q1.a Consider the statement
counter = counter + interest*60 (5+2)
Apply each phase of the compiler on the above statement to generate the target code.

Q1.b Consider the given grammar $S \rightarrow SS+ \mid SS*\mid a$
Draw the parse tree for the string: aa+a*

Q2 Given the regular expression $r = (a|b)^*|ba$ (2+3+2)
a) Convert the given r into NFA using Thompson's construction.
b) Convert the obtained NFA into DFA using subset construction.
c) Minimize the obtained DFA in 2 (b).

Q3 Consider the given grammar (3+2+2)

$$S \rightarrow AaAb|BbBa$$
$$A \rightarrow \epsilon$$
$$B \rightarrow \epsilon$$

a) Construct First and Follow sets for the non-terminals.
b) Construct the LL(1) parsing table
c) Show the parsing stack and the actions for the string: ba

Q4 Consider the given grammar (4+3)

$$S \rightarrow I|other$$
$$I \rightarrow if\ S|\ if\ S\ else\ S$$

a) Construct LR(0) items for the given grammar.
b) Construct the DFA of LR(0) items.

Q5 a) Check whether the given grammar is ambiguous or not. (2+2+3)

$$E \rightarrow E+E|E*E|id$$

b) Remove left recursion of the grammar $Q \rightarrow QL|L$.
c) Explain in brief the kind of errors handled by lexical and syntax analysis phase of a compiler.

**********End of Paper**********