

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Computer Science and Engineering Department

MID SEMESTER EXAMINATION

B. E. (Final Year): Semester-I (2018/19)	Course Code: UCS802
(COE)	Course Name: Compiler Construction
September 27, 2018	Tuesday, 10.30 – 12.30 Hrs
Time: 2 Hours, M. Marks: 25	Name of Faculty: Ashutosh Aggarwal, Geeta Kasana, Karun Verma, Sunita Garhwal

Note: Attempt all the questions. All subparts of the question are to be solved in sequence and in continuation.

- Q1. Consider integer expression grammar. $G =$
 $\{D, T, V\}, \{int, float, id, ;, \}, \{D\}, P$, where P as:
 $D \rightarrow T V$
 $T \rightarrow int \mid float$
 $V \rightarrow id; V \mid id$
- a) Construct FIRST and FOLLOW sets of grammar symbols 2
b) Construct LL(1) parsing table for the grammar. 2
c) Show the actions of the LL(1) parser to recognize input string **int a1; a2; a3** 2
- Q2. Consider the regular expression $(aa|b)^*(a|bb)^*$
- a) Construct NFA for the regular expression using Thomson's rule 2
b) Construct DFA from the NFA above using subset construction method 2
c) Minimize the obtained DFA 2
- Q3. Consider the following expression for language Z. 6
 $s = s + ((i\&j)|(a\&b)\&(a|b))$
Demonstrate how the above expression is converted into machine understandable code through various phases of compiler.
- Q4. Consider the following grammar representing simplified expressions:
- $S \rightarrow def\ id\ O$
 $O \rightarrow O\ Op \mid \epsilon$
 $Op \rightarrow mode \mid scale \mid precision \mid base$
 $mode \rightarrow real \mid complex$
 $scale \rightarrow fixed \mid floating$
 $precision \rightarrow single \mid double$
 $base \rightarrow binary \mid decimal$
- a) Write a rightmost derivation for the input string **def foo real fixed real floating**. Describe at each derivation step the production rule used. 4
b) Draw the parse tree for the string of part (a). 3