

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Computer Science and Engineering Department

MID SEMESTER EXAMINATION

B. E. (Final Year): Semester-I (2019/20)	Course Code: UCS802
(COE)	Course Name: Compiler Construction
September 25, 2019	Tuesday, 15.30 – 17.30 Hrs
Time: 2 Hours, M. Marks: 25	Name of Faculty: Sunita Garhwal, Shalini Batra, Raj Kumar Tekchandani and Karun Verma

Note: Attempt all the questions. Attempt parts of one question in sequence. Draw neat diagrams wherever required. Pencil should only be used to draw diagrams. Assume any missing data.

- Consider the grammar $G = \{\{S\}, \{a, *, +\}, P, \{S\}\}$, where P is set of 2 productions $P = \{S \rightarrow S S + \mid S S * \mid a\}$. Construct the rightmost derivation tree $aaa * a + +$
 - Consider the grammar $G = \{\{S, L, R\}, \{=, *, a\}, P, \{S\}\}$, where P is set of 3 productions $P = \{S \rightarrow L = R, L \rightarrow * R \mid a, R \rightarrow L\}$. Find all the LR(0) items of the above grammar.
- Consider the following Context-Free Grammar $G = \{E, \{E, T, F, M, A\}, \{+, -, \times, \div, id, (,)\}, P\}$ where P is set of productions as

$$\begin{aligned}
 E &\rightarrow E M T \mid T \\
 T &\rightarrow T A F \mid F \\
 F &\rightarrow id \mid (E) \\
 A &\rightarrow + \mid - \\
 M &\rightarrow \times \mid \div
 \end{aligned}$$
 - Compute the FIRST and FOLLOW sets for all grammar symbols and 3 sentential.
 - Generate the parsing table for LL(1) parser. Is G defined above LL(1) 3 grammar. Justify
 - Parse the following string $id_1 \times id_2 + id_3 \div id_4$ 2
- Consider a regular expression $b(a|b)ab^*$
 - Using the syntax tree method, draw the annotated syntax tree. Find the 5 *firstpos*, *lastpos* and *followpos*.
 - Construct the minimized DFA for the above regular expression using the 2 information in 3 a)
- Explain the various steps performed by compiler to convert from higher level 5 language expression to final machine level code. Consider the following expressions to explain all the steps.


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int a = 10, b = 10, c;
c = a + b;
print(c);

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Best Wishes