

Roll No.....

Dr B R Ambedkar National Institute of Technology, Jalandhar
B.Tech. (CSE) VII Sem
CSPC-401- System Programming and Compiler Design
Mid Term Examination, October 2024

Duration: 02 Hour

Max. Marks: 30

Date: 4th October 2024

Q. No.	1(a,b,c,d,e)	2(a,b)	3	4	5	6
Marks	(1+1+1+1+1)	(2.5+2.5)	(5)	(5)	(5)	(5)
CO	1, 2	2	2, 3	2	4	3, 4
C L	R, U	Ap	U	An, C	An, U	U,C

Note: Attempt all the questions.

1. Indicate each of the following statements whether true or false, Justify your answer.

- (a) Semantic analyzer verifies the parse tree, whether it is meaningful or not. (True/False)
- (b) Every LR(0) grammar is SLR(1), but vice versa need not necessarily be true. (True/False)
- (c) NFA and DFA are equivalent, i.e., a corresponding DFA exists for every NFA. (True/ False)
- (d) One can construct a DFA that ensures that some string is enclosed by exactly three pairs of matching parentheses (e.g., (((abc))). (True/False)
- (e) There exists context-free grammar that no NFA can recognize. (True/ False)

2. The statement when the Lexical analyzer reads the source code, it scans the code letter by letter. When it encounters a white space, operator symbol, or special symbol, it decides that a word is completed. Is it true or false? Find the number of different tokens int the following segment code.

```
(a) # include <stdio.h>
int main() {
int N1, N2, Sum;
printf("Enter two integers: ");
scanf("%d %d", &N1, &N2);
Sum = N1 + N2;
printf("%d + %d = %d", N1, N2, Sum); }
```

(b) Defined the Grammar. Let G be a Context Free Grammar for which the production Rules are given below:
S → aB / bA
A → a / aS / bAA
B → b / bS / aBB
Drive the string " aaabbabbba " using Left Most Derivation and Right most Derivation. Finally check whether the given Grammar is ambiguous or not.

3. Eliminate the left recursion from grammar(G1) and eliminate the left factoring from the grammar(G2):

G1:

- E → EOT / T
- O → + / -
- T → TPF / F
- P → *
- F → (E) / id

G2:

S → f / fc / fcd / fcde

4. Write the rules to find the First and Follow set for Non-terminal symbols. Also find the First and Follow for the Grammar G1 given in question number 3.
5. Check whether the grammar G1 given in question number 3 is SLR(1) or not. Justify your answer.
6. Check which of the following Grammar is LR(0), Justify your answer.
 - (a) $E \rightarrow T+E / T, T \rightarrow a$
 - (b) $E \rightarrow E+T / T, T \rightarrow a$