Indian Institute of Technology
Roorkee
Mid Term Examination – Spring 2025
SUBJECTIVE

Degree Program: B.Tech
Course Title: Compiler Design
Date of Examination: 11/03/2025
Teacher's name: Awanish Pandey
Student's name: Anvit Gupta

Time duration: 1.5 hours
Total Marks: 100
Course Code: CSN-352
Enroll No: 2244009

Q.1) For the following grammar

$$S \rightarrow aAc|aBd|bA|bBc$$
$$A \rightarrow z$$
$$B \rightarrow z$$

Check the following membership by creating the parse table

1. LL(1)
2. LR(0)
3. LALR(1)
4. LR(1)

40 marks

Q.2) Prove or disprove that Shift-Shift conflict is not an issue in the LR(1) parser. 10 marks

Q.3) Write the output of the following code when you compile it and run it. Also justify your answer properly.

```
int main(){
  int a = 10, *b;
   *b = 0;
 int c = a/*b ;
 printf ( " % f " , c ) ;
 return 0;
}
```

10 marks

Q.4) Consider the following code snippet (assume 'if' is a KEYWORD)

$$ifl >= esser$$

What will be the output of the tokenizer if the priority of the tokens are

1. KEYWORD, IDENTIFIER, >=, >, =
2. IDENTIFIER, KEYWORD, >, =, >=

Give a proper justification for your answer. 10 marks

Q.5) Rewrite the following SDTs so that underlying grammar becomes non-left-recursive

1.

$$A \rightarrow A\{a\}B|AB\{b\}|0$$
$$B \rightarrow B\{c\}A|BA\{d\}|1$$

Assume a, b, c, d are actions and $0, 1$ are terminals.

2.

$$A \rightarrow A_1 Y \quad \{A.a = g(A_1.a, Y.y)\}$$
$$A \rightarrow X \quad \{A.a = f(X.x)\}$$

Justify your conversion by lebeling all the nodes with their attributes.

15 marks

Q.6) Design an SDT to compute the number of operators in an arithmetic expression for the following grammar.

$$E \rightarrow E + T$$
$$E \rightarrow T$$
$$T \rightarrow T * F$$
$$T \rightarrow F$$
$$F \rightarrow id$$

15 marks

Student's name:

End of exam