Nirma University

Institute of Technology

Semester End Examination (IR/RPR) / SPE, February - 2022

B. Tech. in Computer Science and Engineering, Semester-VII

2CS701 Compiler Construction

Roll / Exam No. _____ Supervisor's Initial with Date _____

Time: 2 Hours Max Marks: 50

Instructions:
1. Attempt all the questions.
2. Figures to right indicate full marks.
3. Draw neat sketches wherever necessary.
4. Assume suitable data wherever required.

Q-1 (A) CLO-1 Consider the following Context-free grammar [6]

$S \rightarrow S\ S\ + \mid S\ S\ * \mid a$

(i) Construct a parse tree for the string aa + a*.

(ii) What language is generated by this grammar?

Q-1 (B) CLO-2 For the following grammar create SLR Parser table and trace the string: "0 + 1 * 0" [6]

$E \rightarrow E * B$

$E \rightarrow E + B$

$E \rightarrow B$

$B \rightarrow 0$

$B \rightarrow 1$

Q-1 (C) CLO-2 Write translation scheme for calculating decimal value from BCD code. For example, value of 1001 0111 0101 is 975. [6]

$S \rightarrow 0\ S \mid 1\ S \mid 0 \mid 1$

OR

Q-1 (C) CLO-2 For the following grammar find out FIRST and FOLLOW sets.

$S \rightarrow E$

$E \rightarrow E\text{-}T \mid T$

$T \rightarrow T/F \mid F$

$F \rightarrow F{+}{+} \mid G$

$G \rightarrow {+}{+}G \mid id$

Q-2 (A) CLO-3 Write down true or false with justification. [6]

1. CLR is more powerful than LALR.
2. Semantic analyser phase is machine dependant phase.
3. if grammar has one Left most derivation and one Right most derivation then grammar is ambiguous.

Q-2 (B) CLO-4 Write Recursive Descent Parser pseudo code for the following grammar: [6]

S → aABb
A → c | BA
B → d | aBbA

OR

Q-2 (B) CLO-4 Show that the following grammar is SLR but not LALR(1). [6]
S->Aa/bAc/Bc/bBa
A->d
B->d

Q-2 (C) CLO-4 Consider the context free grammar **(Ɛ in NULL)** [4]
S->S(S)S
S-> Ɛ with string **(( )( ))**.
1. Give left most derivation
2. Give Right most derivation

Q-3 (A) CLO-4 What do you mean leader in basic blocks? Write all properties of leader. Write down the leaders in the below code. [6]

```
w=0;
x=x+y;
y=0;
if(x>z)
    {
      y=x;
      x++;
    }
else
    {
      y=z;
      z++;
    }
w=x+z;
```

Q-3 (B) CLO-2 What is dead code in code optimization? Eliminate the dead code from the following: [6]

```
int x;
void insert()
      {
          int i;
          i=1;
          x=1;
          x=2;
          return;
          x=3;
}
```

Q-3 (C) CLO-3 Convert the following code into quadruple: [4]
a = b + c * d + e