Indian Institute of Information Technology Sri City, Chittoor

End Exam: Compilers Date: 04-12-2020
Duration: 1.5 Hour Time: 9.00 PM - 10.30 PM

Instructions:

- All questions are mandatory.

1) Answer the following questions(if there are multiple answers please write all) 1*6=6
   a) The number of tokens present in the following statement is:

```
printf("i = %d, &i = %x", i, &i);
```

      i) 23
      ii) 3
      iii) 10
      iv) 21

   b) E → E * F /F-G
      F → F+G/G
      G → G^H/id
      H → id1
      For the above Grammar
      i) ^ have higher precedence than *
      ii) + have higher precedence than *
      iii) - have higher precedence than *
      iv) None of the above

   c) Which of the following parser is/are most powerful
      i) LL(1)
      ii) SLR
      iii) LALR
      iv) CLR

   d) Match all items in Group 1 with correct options from those given in Group 2.

Group 1	Group 2
A. Regular expression	1. Syntax analysis
B. Pushdown automata	2. Code generation
C. Dataflow analysis	3. Lexical analysis
D. Register allocation	4. Code optimization

      i) A-4. B-1, C-2, D-3
      ii) A-3, B-1, C-4, D-2
      iii) A-3, B-4, C-1, D-2
      iv) A-2, B-1, C-4, D-3

   e) The following grammar is SLR

      S → AbBCfD
      A → d
      B → Cg | k

C → m | t
D → g+kC | g

i) The above statement is neither false nor true
ii) The above statement is true
iii) The above statement is false
iv) None of the above

f) Intermediate code is a
i) 3 address code
ii) Syntax tree
iii) Postfix notation
iv) All of the above

2) Write Lex & YACC rules for the following grammar to calculates values 4

S → m*r
r → P+r
P → T-O | Q+O
r → g+T
T → h
Q → -j

3) For the following grammar write the semantic rules and show the step by step translation fow string w=m*h-O+g+h 2+2

S → m*r
r → P+r
P → T-O | Q+O
r → g+T
T → h
Q → -j

4) Perform quadruple and triple for the following expression 1.5

x = (a+b)*(-c+a+b)+d

5) Calculate the FOLLOW of the following grammar 3

string -> string array | tree
array -> incr string | mul
tree -> (string) | Array

6) Generate code for the following three-address statements assuming all variables are stored in memory locations. 2.5

- x = 1
- x = a
- x = a * 1
- x = a - b
- The two statements
  - x = b * c
  - y = a / x