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BCA-20
System Programming
Bachelor of Computer Applications
(BCA-11/16/17)
Examination, 2021 (Winter)

Time : 2 Hours   **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION – A
(Long-answer – type questions)

Note : Section 'A' contains Five (05) long-answer-type questions of twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. What do you mean by ambiguity of language? How to remove the ambiguity? Explain it through suitable example.

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2. What do you mean by recursive descent parser? Construct the recursive descent parser using following grammar:

   1. T → num T
   2. T → * num T | Ɛ

3. What is the use of regular expression? Write all the identities of regular expression. Give the regular expression for the following:

   (i) L = {a, ab, abb, c, cb, cbb, ……}
   (ii) L = {^, a, aa, aaa, aaaa………….}
   (iii) L = {a, aa, aaa, aaaa…………….}
   (iv) L = {a, b}

4. What do you mean by LALR parsing? Construct the LALR parsing table for the following grammar:
   S → CC
   C → aC
   C → d

5. What are the six phases of compiler? Explain with the help of example.

SECTION – B

(Short – answer – type questions)

Note : Section 'B' contains Eight (08) short – answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only.

$$(4 \times 10 = 40)$$

1. What do you mean by NFA and DFA? Construct an NFA and DFA for the language:
$$L = \{(ab \cup aba)*$$

2. Write a lex program to count the no. of
   (a)   Positive and negative integers
   (b)   Positive and negative fractions

3. Consider the following grammar:
   a. $S \rightarrow (L) \mid a$
   b. $L \rightarrow L, S \mid S$

   Construct the parse tree

       (i)   (a, a),

       (ii)   (a, (a, a)),

       (iii)   (a, ((a, a), (a, a)))

4. Write the algorithm to construct the LALR parser.

5. What do you mean by Intermediate code generation? Write the postfix notation for the expression.

6. What do you mean by Chomsky classification of language? Explain with suitable example.

7. Write short notes on: Bootstrapping, Input Buffering, Role of Lexical analyzer.

8. What do you mean by local and global optimization? Explain with suitable example.