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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 43221 Roll No. 1 2 3 0 [redacted]

B. Tech. Examination, 2026

(Even Semester)

COMPILER DESIGN

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

   (a) Which phase of the compiler is optional and why?

   (b) LEX tool is associated from which phase of the compiler?

   (c) Give the difference between parse tree and syntax tree.

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(d) What is the front end and backend of the compiler?

(e) Give any two examples of syntax error.

(f) What is the full form of YACC?

(g) What is the output of the last phase of the compiler?

(h) What are the basic rules of any grammer to be operator precedence?

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Construct the LL(1) parsing table for the following grammer :

$S \rightarrow a\,B\,D\,h$

$B \rightarrow c\,C$

$C \rightarrow b\,C \mid \varepsilon$

$D \rightarrow E\,F$

$E \rightarrow g \mid \varepsilon$

$F \rightarrow f \mid \varepsilon$

(b) What are the various components of language processing system? Explain.

(c) Explain the structure of the compiler in detail.

(d) Check whether given grammer is ambiguous or not. If it is ambiguous then convert it into unambiguous grammer :

$$E \rightarrow E+E / E*E / id$$

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each questions. $8 \times 5 = 40$

3. (a) Find the LR (0) items for the grammer

$$E \rightarrow B\,B$$

$$B \rightarrow C\,B \mid d$$

and make the parsing table and also parse the string "ccdd".

(b) What do you mean by "boot strapping" in compiler? Explain with T-diagram.

(c) Consider the grammer :

$$E \rightarrow E+E \mid E-E \mid E*E \mid E/E \mid a \mid b$$

obtain left most derivation and right most derivation for the string "a + b * a + b".

4. (a) Explain about the problems with top down parsing in detail.

(b) Consider grammer :

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' \mid \varepsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid \varepsilon$$

$$F \rightarrow (E) \mid id$$

Find the FIRST and FOLLOW function for the above grammer.

(c) What are the techniques used in loop optimization? Explain.

5. (a) Write the quadruple, triple and indirect-triple for the following expression :

$$(x+y)*(y+z)+(x+y+z)$$

(b) What do you mean by "Pass" in the compiler? Explain.

(c) Consider the following grammer :

$$S \rightarrow (L) \mid a$$
$$L \rightarrow L, S \mid S$$

Parse the input string (a, (a, a)) using shift reduce parsing.

6. (a) Construct the SLR (1) parsing table for :

$$E \rightarrow E + T / T$$
$$T \rightarrow T * F / F$$
$$F \rightarrow (E) / id$$

(b) Cosntruct a directed acyclic graph to represent the following basic block :

$$x = a + b$$
$$y = c - d$$
$$z = x * y$$

(c) Define semantic errors in a compiler. Discuss the challenges associated with detecting and handling semantic errors.

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