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Sub Code:ECS603

Paper Id: 

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**B. Tech.**  
**(SEM VI) CARRY OVER THEORY EXAMINATION 2017-18**  
**Compiler Design**

**Time: 3 Hours****Total Marks: 100**

**Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.  
2. Any special paper specific instruction.

**SECTION A**

**1. Attempt all questions in brief.****2 x 10 = 20**

- a) what is translator?
- b) Differentiate between compiler and assembler.
- c) Discuss conversion of NFA into a DFA . also give the algorithm used in this conversion.
- d) Write down the short note on symbol table.
- e) Describe Data structure for symbol table .
- f) What is mean by Activation record
- g) What is postfix notations ?
- h) Define Three address Code
- i) What are Quadruples.
- j) what do you mean by regular expression?

**SECTION B**

**2. Attempt any three of the following:****10 x 3 = 30**

- a). Write down the regular expression for
  - 1. The set of all string over {a,b} such that fifth symbol from right is a.
  - 2. The set of all string over {a,b} such that every block of four consecutive symbol contain at least two zero.
- b). Construct the NFA for the regular expression  $a/abb/a^*b^*$  by using Thompson's construction methodology.
- c). Eliminate left recursion from the following grammar
$$S \rightarrow AB, A \rightarrow BS \mid b, B \rightarrow SA \mid a$$
- d). Discuss conversion of NFA into a DFA . also give the algorithm used in this conversion.
- e). Explain non recursive predictive parsing. Consider the following grammar and construct the predictive parsing table

$$E \rightarrow TE'$$
$$E' \rightarrow +TE' \mid \epsilon$$
$$T \rightarrow FT'$$
$$T' \rightarrow *FT' \mid \epsilon$$
$$F \rightarrow F^* \mid a \mid b$$

**3. Attempt any *one* part of the following: 10 x 1 = 10**

a). Give Operator –precedence parsing algorithm. Consider the following grammar and build up operator precedence table. Also parse the input string (id+(id\*id))

$$E \rightarrow E+T \mid T$$

$$T \rightarrow T * F \mid F$$

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

b). For the grammar

$$S \rightarrow aAd \mid bBd \mid aBe \mid bAe \quad A \rightarrow f, \quad B \rightarrow f$$

Construct LR(1) Parsing table .also draw the LALR table from the derived LR(1) parsing table.

**4. Attempt any *one* part of the following: 10 x 1 = 10**

a). What is postfix notations ? translate  $(C+D)*(E+Y)$  into postfix using syntax directed translation scheme(STDS)

b). consider the following grammar  $E \rightarrow E+E \mid E * E \mid (E) \mid id$  . construct the SLR parsing table and suggest your final parsing table.

**5. Attempt any *one* part of the following: 10 x 1 = 10**

a). Explain logical phase error and syntactic phase error . also suggest methods for recovery of error.

b). Generate three address code for  $C[A[i, j]] = B[i, j] + C[A[i, j]] + D[i + j]$  (You can assume any data for solving question , if needed) Assuming that all array elements are integer. Let A and B a 10 X 20 array with low1 =low2=1.

**6. Attempt any *one* part of the following: 10 x 1 = 10**

a). Give the algorithm for the elimination of local and global common Sub expression . discuss the algorithm with the help of example also.

b). consider the following three address code segments

$$PROD := 0$$

$$I := 1$$

$$T1 := 4 * I$$

$$T2 := \text{addr}(A) - 4$$

$$T3 := T2[T1]$$

$$T4 := \text{addr}(B) - 4$$

$$T5 := T4[T1]$$

$$T6 := T3 * T5$$

$$PROD := PROD + T6$$

$$I := I + 1$$

$$\text{If } i \leq 20 \text{ goto (3)}$$

a. Find the basic blocks and flow graph of above sequence.

b. Optimize the code sequence by applying function preserving transformation and loop optimization technique.



7. Attempt any *one* part of the following:

a). . Write short note on

- i. Loop optimization
- ii. Global data analysis

b). . Write short note on

- i. Direct acyclic graph
- ii. YACC parser generator

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