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T.Y. B.Sc. (Fourth Semester) EXAMINATION, 2017

COMPUTER SCIENCE

Paper II

(CS-342 : Compiler Construction)

(2013 PATTERN)

Time : Two Hours

Maximum Marks : 40

N.B. :— (i) *All questions are compulsory.*

(ii) *Figures to the right indicate full marks.*

(iii) *All questions carry equal marks.*

(iv) *Neat diagrams must be drawn wherever necessary.*

1. Attempt *all* of the following :

[10×1=10]

(a) State True or False. Target code is generated in analysis phase of a compiler.

(b) Define Parse Tree.

(c) List any *two* LEX Library functions.

(d) Which one is the most powerful parser in Bottom up parsers ?

(e) Compute FIRST for the following productions :

$S \rightarrow AB \mid Ad$

$A \rightarrow aA \mid \epsilon$ (epsilon)

$B \rightarrow bB \mid \epsilon$ (epsilon)

P.T.O.

- (f) Define the term inherited attribute.
- (g) State True or False : Three address code is used in intermediate code generation.
- (h) Define static memory allocation.
- (i) What is the use of Directed Acyclic Graph (DAG) ?
- (j) Define the term Basic block.

2. Attempt any *two* of the following : [2×5=10]

- (a) Write a Recursive Descent Parser (RDP) for the following grammar :

$$S \rightarrow aAb \mid Sa$$

$$A \rightarrow Ab \mid b.$$

- (b) For the input expression $10 * 9 * 8 * (7 + 6)$, design SDD and draw annotated tree using the following grammar :

$$L \rightarrow E$$

$$E \rightarrow E_1 + T \mid T$$

$$T \rightarrow T_1 * F \mid F$$

$$F \rightarrow (E) \mid \text{digit}$$

- (c) Write a LEX program of find sum of first n numbers.

3. Attempt any *two* of the following : [2×5=10]

- (a) Check whether the given grammar is LL(1) or not :

$$S \rightarrow SeB \mid eA$$

$$A \rightarrow AaB \mid B$$

$$B \rightarrow bB \mid \epsilon \text{ (epsilon)}.$$

(b) Construct Directed Acyclic Graph (DAG) for the following expression :

(i) $(a + a * (b - c) + (b - c) * d)$

(ii) $(a + b) + (a + b).$

(c) Differentiate between one pass compiler and two pass compiler.

4. Attempt any *one* (either A or B) of the following :

(A) (i) Check whether the given grammar is SLR(1) or not : [6]

$$S \rightarrow aAb|aBb|aAd$$

$$A \rightarrow dS|d$$

$$B \rightarrow e$$

(ii) Write a short note on displays with the help of a diagram. [4]

Or

(B) (i) Check whether the given grammar is LALR(1) or not : [6]

$$S \rightarrow \langle L \rangle | a$$

$$L \rightarrow L, S | S.$$

(ii) Construct triples and quadruples for the following expression

$$(a + b) * (m - n) \uparrow (m + n). [4]$$