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BICS-016

B.Tech. – VIEP – COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

00223

December, 2016

BICS-016 : SYSTEM PROGRAMMING AND COMPILER DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks.*

1. For a context-free grammar, production rules are given as follows :

$S \rightarrow AB$

$A \rightarrow aAb / ab$

$B \rightarrow cBd / cd$

Write down the language accepted by these production rules. *10*

2. Create the NFA for the Regular Expression (aa*) / (bb*) and convert the NFA to DFA. *10*

3. (a) What is a Parse tree ? How can the ambiguity be removed ? Explain with an example. *5*

(b) What is book-keeping in the compiler ? *5*

4. Define a Directed Acyclic Graph. Construct a DAG and write the sequence of instructions for the expression

$$a + a*(b - c) + (b - c)*d.$$ *10*

5. Consider the following grammar and construct the SLR parsing table : *10*

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

$$T \rightarrow TF \mid F$$

$$F \rightarrow F* \mid a \mid b$$

6. Construct the DFAs for the following regular expression : *10*

$$(a* \mid b*)* \text{ abb } (a \mid b)*$$

7. (a) Discuss the schemes for error detection and recovery in each phase of a compiler. *5*

   (b) Describe the merits and demerits of single-pass and multi-pass compilers. *5*

8. (a) Write the quadruples, triples and indirect triples of the following expression : *5*

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

   (b) Describe code optimization techniques with suitable examples. *5*

9. (a) Describe the different data structures used in symbol table implementation. *5*

   (b) Define basic blocks and flow graphs. *5*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) Boot Strapping

(b) Regular Expression

(c) DAG