

## 2000 Paper 6 Question 6

### Compiler Construction

Describe how a parse tree can be translated into a sequence of assembly language instructions based on a pattern matching graph derived from a set of tree rewriting rules where each rule has a cost and a corresponding fragment of code. Illustrate your answer using the following rules:

$R_i = K_k$	LDI $R_i, K_k$	Cost 2
$R_i = \text{add}(R_i, K_k)$	ADDI $R_i, K_k$	Cost 3
$R_i = \text{add}(R_i, R_j)$	ADD $R_i, R_j$	Cost 3
$R_i = \text{add}(R_i, \text{add}(R_j, K_k))$	ADD $R_i, R_j, K_k$	Cost 4

applied to the following parse tree:

$\text{add}(K_1, \text{add}(\text{add}(K_2, \text{add}(K_3, K_4)), \text{add}(K_5, K_6)))$  [15 marks]

Discuss the advantages and disadvantages of this approach to code generation.

[5 marks]