1994 Paper 3 Question 3

Formal Languages and Automata

What is meant by the *language accepted* by a finite deterministic automaton $M = (Q, \Sigma, \delta, i, F)$? [2 marks]

Show that it is possible to associate with M a regular expression $\mathbf{r}$ over Σ denoting the same language as that accepted by M. [12 marks]

Illustrate your answer by constructing such a regular expression $\mathbf{r}$ when M is the finite deterministic automaton with

$$
\begin{aligned}
Q &= \{q_1, q_2, q_3\} \\
\Sigma &= \{0, 1\} \\
i &= q_1 \\
F &= \{q_3\}
\end{aligned}
$$

and with transition function δ defined by the table

	q_1	q_2	q_3
0	q_2	q_3	q_3
1	q_3	q_2	q_2

[6 marks]

1