a slot at the leading edge of the aerofoil

(c)(i) For infinite string need initial conditions

$$u(x,0) = p(x) \quad , \quad \frac{\partial u}{\partial t}(x,0) = g(x)$$

(ii) For finite string $0 \le x \le L$, also require boundary condition at $x = 0, L$.

e.g. fixed end $u\left(\begin{smallmatrix}0\\L\end{smallmatrix}, t\right) = 0$

or free end $\frac{\partial u}{\partial x}\left(\begin{smallmatrix}0\\L\end{smallmatrix}, t\right) = 0$

(i) For infinite string, use d'Alembert's soln

$$u(x,t) = \tfrac{1}{2}\left[p(x-ct) + p(x+ct)\right] + \frac{1}{2c}\int_{x-ct}^{x+ct} g(s)\,ds.$$

(ii) For finite string, can use d'Alembert's soln, but have to extend $p(x)$ & $g(x)$ to $-\infty < x < \infty$. Usually use separation of variables by looking for solution of type $u(x,t) = X(x)T(t)$

(i) Travelling wave is $u(x,t) = f(x \mp ct)$, which is wave travelling to $\overset{\text{left}}{\text{right}}$ with unchanged profile

(ii) Standing wave is $u(x,t) = X(x)\,T(t)$. Points on string, called nodes, which are always at rest.