)

$$U(x,t) = A\left(kt + x^2/2\right) + Bx$$

$$\frac{\partial u}{\partial t} = Ak$$

$$\frac{\partial u}{\partial x} = Ax + B$$

$$\frac{\partial^2 u}{\partial x^2} = A$$

$$\frac{\partial^2 u}{\partial x^2} = \frac{1}{k}\frac{\partial u}{\partial t} = A$$

$$\frac{\partial u}{\partial x}(0,t) = S_0 \Rightarrow A = S_0$$

$$\frac{\partial u}{\partial x}(a,t) = S_1 \Rightarrow Aa + S_0 = S_1$$

$$A = \frac{S_1 - S_0}{a}, \quad B = S_0$$

$$\frac{\partial u}{\partial t} = Ak$$

$\therefore$ Flux depends upon the value of Ax