1 (a) reflecting boundary condition

$$\left.\frac{\partial \rho}{\partial x}\right|_{\partial \Omega} = 0 \quad , \quad \rho(x, t \to \infty) \neq 0$$

$$\frac{\partial \rho}{\partial t} = D \frac{\partial^2 \rho}{\partial x^2} + c\rho$$

$$\rho(x,t) = X(x)\, T(t)$$

$$X \frac{\partial T}{\partial t} = D T \frac{\partial^2 X}{\partial x^2} + c X T$$

$$\frac{1}{T}\frac{\partial T}{\partial t} = \frac{D}{X}\frac{\partial^2 X}{\partial x^2} + c$$

$$\frac{1}{T}\frac{dT}{dt} = \alpha \quad , \quad T(t) = T(0)\, e^{\alpha t}$$

$$\frac{D}{X}\frac{d^2 X}{dx^2} + c = \alpha \quad , \quad \frac{d^2 X}{dx^2} = \frac{\alpha - c}{D} X$$

$$X(x) = \cos \frac{n\pi}{L} x$$

$$\left.\frac{\partial \rho}{\partial x}\right|_{\partial \Omega} = 0 \quad , \quad \frac{d(x)}{dx} = -\frac{n\pi}{L} \sin \frac{n\pi}{L} x$$

$$\left.\frac{dX}{dx}\right|_{x = \frac{L}{2}} = \left.\frac{dX}{dx}\right|_{x = -\frac{L}{2}}$$

$$\rho(x, t \to \infty) \neq 0$$

$$T(\infty) = T(0)\, e^{\infty} \neq 0$$

(this is how much I could get ...)