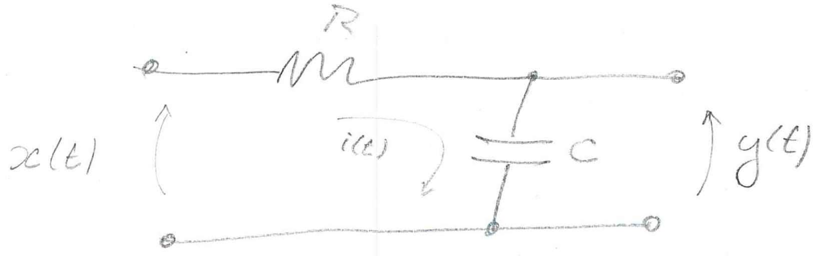
$\boxed{\text{Full solution}}$

$$y(t) = 1 - e^{-t/RC}$$



$i = C.\frac{dy}{dt}$

$x - RC.\dot{y} = y$: Mesh-Rule

DGl : $\boxed{RC.\dot{y}(t) + y(t) = x(t)}$

If $x(t) = \varepsilon(t)$ step $\Longrightarrow$ $y(t) = h(t)$ step response

$$y(t) = \underbrace{y_h(t)}_{\text{homogene solution (for } x(t)=0)} + \underbrace{y_p(t)}_{\text{particular solution (for specific } x(t))}$$

} From Math Theory

$\boxed{\text{Homogene Solution}}$ $RC.\dot{y}_h + y_h = 0$ / Hypothesis: $y_h = A.e^{st}$

$A.e^{st}.\left[RC.s + 1\right] = 0 \Rightarrow s = -1/RC \Rightarrow$ $y_h = A.e^{-t/RC}$

$\boxed{\text{Particular Solution}}$ $RC.\dot{y}_p + y_p = \varepsilon(t)$ / Hypothesis $y_p \approx B.x(t)$

$y_p = C$; $t > 0$

and solution valid for $t > 0$ (avoid discontinuity) for shorter/simpler calculation

$\boxed{\text{Combining all}}$ (also initial conditions AB)

Convention for step/impulse responses take $AB = 0$

Hypothesis : $y = C + A.e^{-t/RC}$

for $t > 0$ $\dot{y} = -\frac{A}{RC}.e^{-t/RC}$

$\Rightarrow$ $-A.e^{-t/RC} + (C + A.e^{-t/RC}) = 1$

$C = 1$