Q $$F(s) = \frac{6(s-3)}{(3s^2+27s+60)(s+4)}$$

(a) $$F(s) = \frac{6(s-3)}{3(s+5)(s+4)^2}$$ (2)

$$\frac{2(s-3)}{(s+5)(s+4)^2} = \frac{A}{s+5} + \frac{B}{s+4} + \frac{C}{(s+4)^2}$$ (2)

on solving

$A = -16$

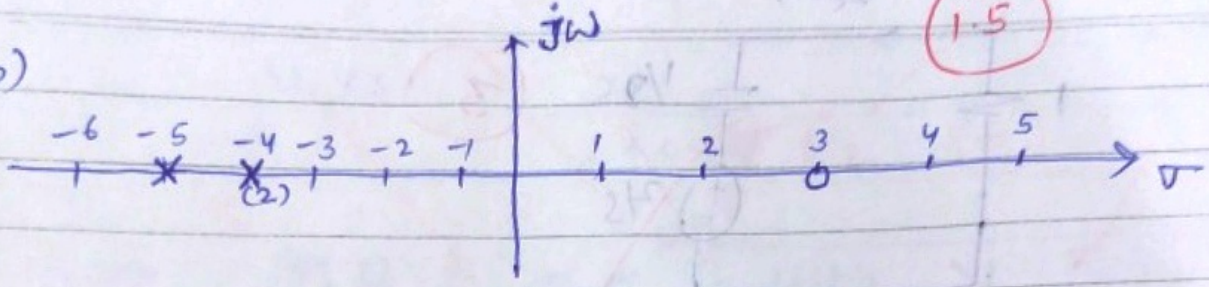
$B = 16$ (1.5)

$C = -14$

$$= \frac{-16}{(s+5)} + \frac{16}{(s+4)} - \frac{14}{(s+4)^2}$$

$$f(t) = -16e^{-5t}u(t) + 16e^{-4t}u(t) - 14te^{-4t}u(t)$$ (1.5)

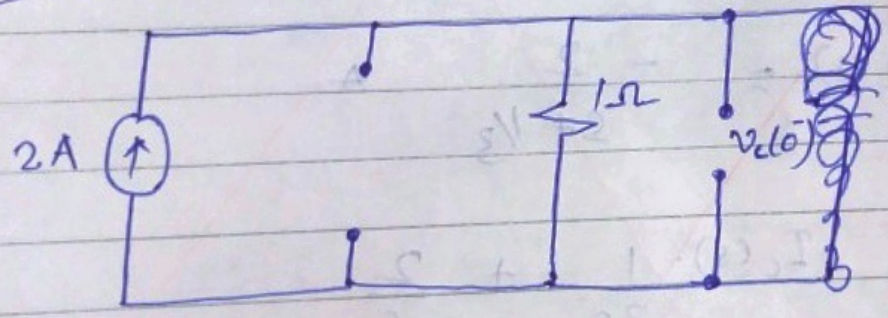
(b)



1.5

(c) System is Stable. 1.5

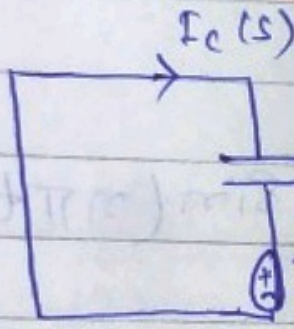
Soln 2 at $t < 0$



3

$v_c(0^-) = 2\,V$; $i_c(0^-) = 0\,A$

$t>0$



3

$$-\frac{1}{2s} \cdot I_c(s) - \frac{2}{s} = 0$$

4

$$I_c(s) = -4 \text{ A}$$

$$i_c(t) = -4\,u(t) \text{ A} \qquad t>0$$