have opposite directions in frame S'.

Also, the total relativistic energy of the original particle will be shared equally between them.

So, in frame S', $E_{(electron)} = \frac{1}{2} \times 2.40 \times 10^{-30} \times 9 \times 10^{16}$

$= 10.8 \times 10^{-14}$ J

Now, $10.8 \times 10^{-14} = \dfrac{9.1 \times 10^{-31} \times 9 \times 10^{16}}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}$

$\therefore \sqrt{1 - \left(\frac{v}{c}\right)^2} = 0.758$

$\therefore v = 0.652c \quad (= 1.956 \times 10^{8}\ ms^{-1})$

(c) Now we need some clear thinking!!

(i) we know how far the e^- has to travel to Earth, as measured by Earth observer at O, in S.

(ii) what we need to know, is how fast is the electron moving as measured by observer on Earth, in S.

We need v_x

We know $v_x' = -0.652c$.

We know V in formula is $(-0.80c)$

So, $-0.652c = \dfrac{v_x - (-0.80c)}{1 - \frac{(-0.80c)(v_x)}{c^2}}$