

8(a)	wavelength associated with a moving particle
8(b)	$\lambda = h / p$
	$= (6.63 \times 10^{-34}) / (9.11 \times 10^{-31} \times 4.9 \times 10^7)$
	$= 1.5 \times 10^{-11} \text{ m}$
8(c)	similarity: <i>any one point from:</i> • same mass • same <u>magnitude</u> of charge • both leptons
	difference: <i>any one point from:</i> • electron has negative charge, positron has positive charge • positron is anti-particle of electron • electron is a particle, positron is an anti-particle
8(d)(i)	(pair) annihilation
8(d)(ii)	their mass gets converted into energy
	(their mass–energy) becomes the energy of the gamma photons
8(d)(iii)	they travel in opposite directions to conserve momentum
8(d)(iv)	kinetic energy = $\frac{1}{2} \times 9.11 \times 10^{-31} \times (4.9 \times 10^7)^2 = 1.1 \times 10^{-15} \text{ J}$
8(d)(v)	$E = mc^2$
	$E = hc / \lambda$ or $E = hf \text{ and } c = f\lambda$
	$(1.1 \times 10^{-15}) + (9.11 \times 10^{-31} \times (3.00 \times 10^8)^2) = (6.63 \times 10^{-34} \times 3.00 \times 10^8) / \lambda$ $\lambda = 2.39 \times 10^{-12} \text{ m}$