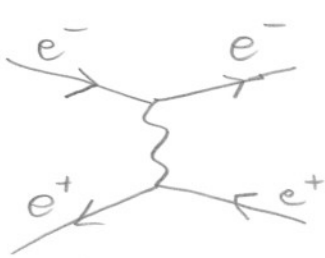
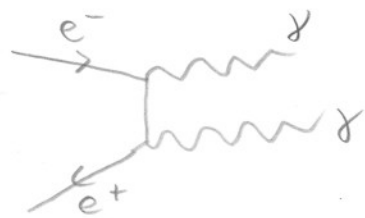
Particle Physics Worksheet #2 Answers

(1) - pictoral representations of particle interactions
- the diagram represents the amplitude of the process
- the square of the amplitude is the probability of the process actually taking place

(2) (a)

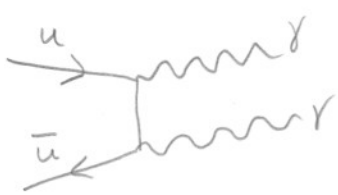


(b)

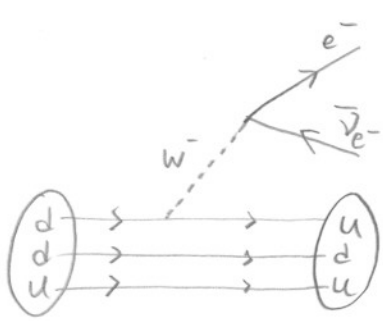


(3)

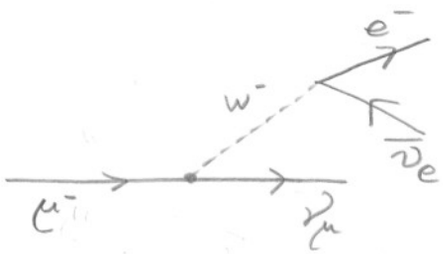
(4)



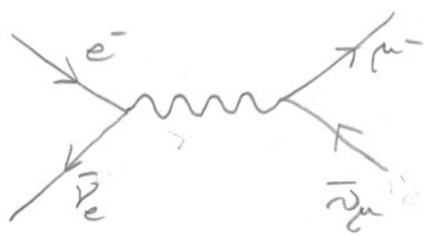
(5)



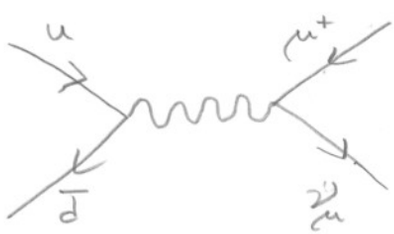
(6) (a)



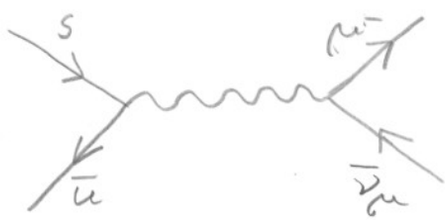
(b)



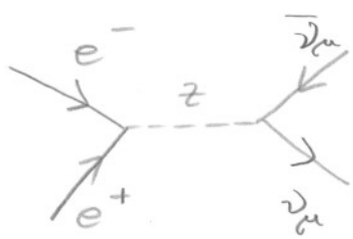
(c)



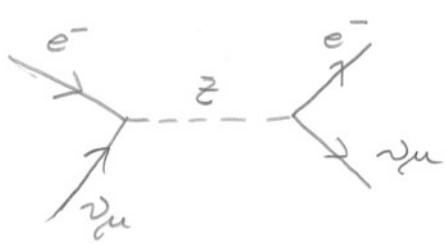
(d)



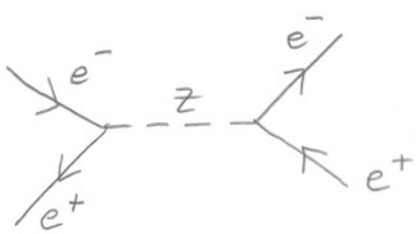
(7) (a)



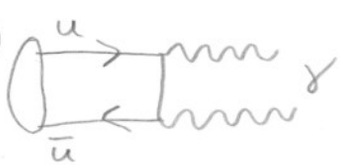
(b)



(c)



(8) (a)



(b) momentum must be conserved in the interactions

(c) $E = hf \qquad c = \lambda f \qquad E = \frac{hc}{\lambda}$

$$\lambda = \frac{hc}{E} = \frac{(6.63\times10^{-34}\ \text{Js})(3\times10^{8}\ \text{ms}^{-1})}{(1.6\times10^{-19}\ \text{J eV}^{-1})\left(\frac{135\times10^{6}\ \text{eV}}{2}\right)} = \underline{1.8\times10^{-14}\ \text{m}}$$