5) A $t=0$, $|\psi(t=0)\rangle = |a\rangle = \frac{|A\rangle + |B\rangle}{\sqrt{2}}$ so we have

energy	probability
E_0+T	$(1/\sqrt{2})^2 = 1/2 = 50\%$
E_0-T	$(1/\sqrt{2})^2 = 1/2 = 50\%$

6) $|\psi(t)\rangle = \frac{e^{-i(E_0+T)t/\hbar}}{\sqrt{2}}|A\rangle + \frac{e^{-i(E_0-T)t/\hbar}}{\sqrt{2}}|B\rangle$ so we have

energy	probability
E_0+T	$\left\lvert\frac{e^{-i(E_0+T)t/\hbar}}{\sqrt{2}}\right\rvert = 1/2 = 50\%$
E_0-T	$\left\lvert\frac{e^{-i(E_0-T)t/\hbar}}{\sqrt{2}}\right\rvert = 1/2 = 50\%$

7) After the measurement the state vector is $|\psi(t_1)\rangle = |b\rangle = \frac{|A\rangle - |B\rangle}{\sqrt{2}}$

energy	probability
E_0+T	$(1/\sqrt{2})^2 = 1/2 = 50\%$
E_0-T	$(1/\sqrt{2})^2 = 1/2 = 50\%$