21. 解：

由题意知，

$$\frac{(\overline{X}-\overline{Y})-(\mu_1-\mu_2)}{S_w\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}\sim t(n_1+n_2-2)$$

其中，

$$S_w^2=\frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}, S_w=\sqrt{S_2^2}$$

故置信区间为，

$$\left((\overline{X}-\overline{Y})\mp t_{\frac{\alpha}{2}}(n_1+n_2-2)S_w\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}\right)$$

由题知，$n_1=4, n_2=5, 3S_1^2=2.475\times10^{-5}, 4S_2^2=2.08\times10^{-5}, S_w=\sqrt{\frac{3S_1^2+4S_2^2}{7}}=2.55\times10^{-3}, 1-\alpha=0.95, \frac{\alpha}{2}=0.025, t_{0.025}(7)=2.3646$

故置信区间为，

$$\left(0.00205\mp2.3646\times0.00255\times\sqrt{\frac{1}{4}+\frac{1}{5}}\right)=(0.002\mp0.004)=(-0.002,0.006)$$

22. 解：

由题意知，

$$\frac{S_1^2/S_2^2}{\sigma_1^2/\sigma_2^2}\sim F(n_1-1,n_2-1)$$

故，

$$P(F_{1-\frac{\alpha}{2}}(n_1-1,n_2-1)<\frac{S_1^2/S_2^2}{\sigma_1^2/\sigma_2^2}<F_{\frac{\alpha}{2}}(n_1-1,n_2-1))=1-\alpha$$

故置信区间为，

$$\left(\frac{S_1^2}{S_2^2}\frac{1}{F_{\frac{\alpha}{2}}(n_1-1,n_2-1)},\frac{S_1^2}{S_2^2}\frac{1}{F_{1-\frac{\alpha}{2}}(n_1-1,n_2-1)}\right)$$

由题知，$n_1=n_2=10, s_A^2=0.5419, s_B^2=0.6065, 1-\alpha=0.95$

故解得置信区间为，

$$(0.222, 3.601)$$