66) $\Delta P = -P \cdot \text{Mod } D \cdot \Delta i$

$P = 1000$ since the bond is bought at par

$\text{Mod } D = \text{Mac } D \cdot v = \dfrac{7.959}{1.072}$

$\Delta i = .08 - .072 = .008$

$\therefore \Delta P = -1000\left(\dfrac{7.959}{1.072}\right)(.008) = -59.395\ldots$

$\therefore P^{new} = 1000 + \Delta P = 940.60$

178) $$\Delta P = P\left[\left(\frac{1.10}{1.1025}\right)^{11} - 1\right]$$

$$\therefore \quad \frac{\Delta P}{P} = \left(\frac{1.1}{1.1025}\right)^{11} - 1 = -0.02466\cdots$$

187) $\Delta P = -P \cdot \text{Mod } D \cdot \Delta i$

$$\text{Mod } D = \text{Mac } D \cdot v = \frac{11}{1.1} = 10$$

$$\therefore \frac{\Delta P}{P} = -10 \cdot (.0025) = -.025$$

188) $\Delta P = P\left[\left(\frac{1+i_{old}}{1+i_{new}}\right)^{MacD} - 1\right]$

$P = 1000$ since the bond is bought at par

$\therefore \Delta P = 1000\left(\left(\frac{1.072}{1.08}\right)^{7.959} - 1\right) = -57.458\ldots$

$\therefore P^{new} = 1000 + \Delta P = 942.54$

189) For E_{MAC}, $\Delta P = P \cdot \left(\left(\frac{1.064}{1.07}\right)^{MacD} - 1 \right)$

$$MacD = 8(1.064) = 8.512$$

$$\therefore \Delta P = 112955 \left(\left(\frac{1.064}{1.07}\right)^{8.512} - 1 \right)$$

$$= -5279.255\ldots$$

$$\therefore E_{MAC} = 112955 + \Delta P = 107676$$

For E_{MOD}, $\Delta P = -P \cdot ModD \cdot \Delta i = -112955(8)(.006)$

$$= -5421.84$$

$$\therefore E_{MOD} = 112955 + \Delta P = 107533$$

$$\therefore E_{MAC} - E_{MOD} = 143$$

190) Using $i = .0432$, the portfolio has

$$P = 35000 + 65000 = 100000$$

$$MacD = 7.28\left(\frac{35000}{100000}\right) + 12.74\left(\frac{65000}{100000}\right) = 10.829$$

Using the new interest rate i, $\Delta P = 5000$

$$\therefore\ 5000 = 100000\left(\left(\frac{1.0432}{1+i}\right)^{10.829} - 1\right)$$

$$\Rightarrow i = .03851\cdots$$

191) $\Delta P = 121212 - 123000 = -1788$

$$\therefore \quad -1788 = 123000\left(\left(\frac{1.05}{1.054}\right)^{macD} - 1\right)$$

$$\Rightarrow macD = 3.85117\ldots$$

$$\therefore \ ModD = macD \cdot v = \frac{3.85117\ldots}{1.05} = 3.667\ldots$$