In-Class Exercise Solution

Step 1: T = 10, N = 2, y=6%, R = 6%, F = \$100,000, C = \$3,000 ($= 6\% \times \$100{,}000/2$).

Step 2: For the annuity value can be calculated by $\mathrm{PV_A}(\mathrm{r};\mathrm{t}) = \frac{1}{\mathrm{r}}\left[1 - \frac{1}{(1+\mathrm{r})^{\mathrm{t}}}\right]$,

which is $\mathrm{PV_A}(3\%; 20) = \frac{1}{0.03} \times \left[1 - \frac{1}{(1+0.03)^{20}}\right] = 14.8775.$

Step 3: For the face value, the discount factor is $DF(\mathrm{r};\mathrm{t}) = \frac{1}{(1+\mathrm{r})^{\mathrm{t}}}$,

which is $DF(3\%; 20) = \frac{1}{(1+0.03)^{20}} = 0.5537.$

Step 4: $\text{Bond value} = \mathrm{C} \times \mathrm{PV_A}(\mathrm{r};\mathrm{t}) + \mathrm{F} \times DF(\mathrm{r};\mathrm{t})$

$= \$3{,}000 \times 14.8775 + \$100{,}000 \times 0.5537$

$= \$100{,}000.$

The bond is now valued at par. We have: a bond trades at par if its yield equals its coupon rate.