1. (25%) A 10,000 par value 10-year bond with 8% annual coupons is bought at a premium to yield an annual effective rate of 6%.
Calculate the interest portion of the 7th coupon.

\[ \text{(A) 632} \quad \text{(B) 642} \quad \text{(C) 651} \quad \text{(D) 660} \quad \text{(E) 667} \]

\[ @i = 6\% \quad BV_6 = 10000 \cdot \frac{1}{(1 + 0.06)^6} + 800 \cdot A_{7 | 0.06} = 10693 \]

\[ I_7 = BV_6 \cdot i = 641.58 \]

2. (25%) Matt purchased a 20-year par value bond with semiannual coupons at a nominal annual rate of 8% convertible semiannually at a price of 1722.25. The bond can be called at par value \( X \) on any coupon date starting at the end of year 15 after the coupon is paid. The price guarantees that Matt will receive a nominal annual rate of interest convertible semiannually of at least 6%.
Calculate \( X \).

\[ \text{(A) 1400} \quad \text{(B) 1420} \quad \text{(C) 1440} \quad \text{(D) 1460} \quad \text{(E) 1480} \]

Find earliest possible date to call

\[ \text{Price} = 1722.25 = \frac{8\%}{2} \cdot X \cdot A_{20 | 3\%} + X \cdot V_{30} \quad @3\% \]

\[ X = 1440.0 \]

**Your answers:** (Leave blank if you need no grading)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>E</td>
<td>E</td>
</tr>
</tbody>
</table>
3. (25%) Sue purchased a 10-year par value bond with semiannual coupons at a nominal annual rate of 4% convertible semiannually at a price of 1021.50. The bond can be called at par value X on any coupon date starting at the end of year 5. The price guarantees that Sue will receive a nominal annual rate of interest convertible semiannually of at least 6%.

Calculate X.

\[ 1021.50 = 0.02 \cdot X \cdot 10^{-5} + X \cdot 1.02^2 \, @ \, 3\% \]

\[ X = 1200.07 \]

4. (25%) You are given the following information with respect to a bond:

Par amount: 1000; Term to maturity 3 years; Annual coupon rate 6% payable annually

<table>
<thead>
<tr>
<th>Term</th>
<th>Annual Spot Interest Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7%</td>
</tr>
<tr>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>9%</td>
</tr>
</tbody>
</table>

Calculate the annual effective yield rate for the bond if the bond is sold at a price equal to its value.

\[ \text{Price} = \frac{60}{1.07} + \frac{60}{1.08^2} + \frac{1060}{1.09^3} = 926.03 \]

\[ \text{Set} = 60 \cdot A_{3,7} + 1000 \cdot V^2 \]

\[ \text{BAII} \quad PV = -926.03 \quad PMT = 60 \quad FV = 1000 \quad N = 3 \]

\[ \text{CPT} \quad i/y \Rightarrow 8.9\% \]