Study Note FM-09-05, Problem No. 54
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 \( X \).

A. 1400  B. 1420  C. 1440  D. 1460  E. 1480

Solution.
The expression “par value bond” means that the redemption value equals the par value. The coupon rate of 4% per half year is greater than the yield of 3% effective per six months. Therefore, this bond sells at a premium. Hence, the minimum yield rate that accounts for the possibility of the bond being called is calculated at the earliest possible call date, i.e., exactly 15 years from the date of purchase, as that would be the most disadvantageous date for the bondholder for the call to occur. The par value \( X \) therefore satisfies the equation:

\[
1722.25 = 0.04 \cdot X \cdot a_{\overline{30}|3\%} + \frac{X}{1.03^{30}},
\]

so that

\[
X = \frac{1722.25 - 0.04 \cdot a_{\overline{30}|3\%}}{1.03^{30}} \approx 1440.01.
\]

Answer C.

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