Study Note FM-09-05, Problem No. 57
Mary 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 1100 on any coupon date starting at the end of year 5. What is the minimum yield that Mary could receive, expressed as a nominal annual rate of interest convertible semiannually?

A. 4.8%  B. 4.9%  C. 5.0%  D. 5.1%  E. 5.2%

Solution.
This bond sells at a discount (1021.50 is less than 1100), so its coupon rate must be lower than the going market rate. Hence, the minimum yield rate that accounts for the possibility of the bond being called is calculated to the latest possible call date, i.e., exactly 10 years from the date of purchase, as that would be the most disadvantageous date for the bondholder for the call to occur. The yield rate \( j = \frac{i^{(2)}}{2} \) per coupon period must satisfy the equation:

\[
1021.5 = 0.02 \cdot 1100 \cdot a^{20}_{20j} + \frac{1100}{(1 + j)^{20}},
\]

and using a financial calculator, we obtain \( j = 2.45587\% \), so that

\[
i^{(2)} = 2j \approx 4.912\%.
\]

Answer B.

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