

## Section 5 Examples

1. A 10,000 par value bond with 8% semiannual coupons is being sold 3 years and 4 months before the bond matures. The purchase will yield 6% convertible semiannually to the buyer. Determine the difference between the market price calculated using the theoretical method and the market price calculated using the semi-theoretical method.

- a. .26      b. .55      c. .81      d. 1.05      e. 1.31

2. A 1000 face value 20-year 8% bond with semiannual coupons is purchased for 1014. The redemption value is 1000. The coupons are reinvested at a nominal annual rate of 6%, compounded semiannually. Determine the purchaser's annual effective yield rate over the 20-year period.

- a. 6.9%      b. 7.0%      c. 7.1%      d. 7.2%      e. 7.3%

3. A 9% bond with a 1000 par value and coupons payable semiannually is redeemable at maturity for 1100. At a purchase price of  $P$ , the bond yields a nominal annual interest rate of 8% compounded semiannually, and the present value of the redemption value is 190. Determine  $P$ .

- a. 1050      b. 1085      c. 1120      d. 1165      e. 1215

4. A 1000 bond with annual coupons is redeemable at par at the end of 10 years. At a purchase price of 870, the yield rate is  $i$ . The coupon rate is  $i - .02$ .

Calculate  $i$ .

- a. 6.7%      b. 7.2%      c. 7.7%      d. 8.2%      e. 8.7%

5. A bond with coupons equal to 40 sells for  $P$ . A second bond with the same maturity value and term has coupons equal to 30 and sells for  $Q$ . A third bond with the same maturity value and term has coupons equal to 80. All prices are based on the same yield rate, and all coupons are paid at the same frequency. Determine the price of the third bond.

- a.  $4P - 4Q$       b.  $4P + 4Q$       c.  $4Q - 3P$       d.  $5P - 4Q$       e.  $5Q - 4P$

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6. Becky buys an  $n$ -year 1000 par value bond with 6.5% annual coupons at a price of 825.44. The price assumes an annual effective yield rate of  $i$ . The total write-up in book value of the bond during the first 2 years after purchase is 23.76.

Calculate  $i$ . ( $i > 0$ )

- a. 8.50%      b. 8.75%      c. 9.00%      d. 9.25%      e. 9.50%

7. An  $n$ -year 1000 par value bond with 8% annual coupons has an annual effective yield of  $i$ ,  $i > 0$ . The book value of the bond at the end of year 3 is 1099.84 and the book value at the end of year 5 is 1082.27. Calculate the purchase price of the bond.

- a. 1112      b. 1122      c. 1132      d. 1142      e. 1152

8. A 30-year 10,000 bond that pays 3% annual coupons matures at par. It is purchased to yield 5% for the first 15 years and 4% thereafter. Calculate the amount for accumulation of discount for year 8.

- a. 78      b. 83      c. 88      d. 93      e. 98

9. A 1000 par value 3-year bond, redeemable at par, with annual coupons of 50 for the first year, 70 for the second year, and 90 for the third year, is bought to yield a force of interest  $\delta_t = \frac{2t-1}{2(t^2-t+1)}$  for  $t > 0$ . Calculate the price of this bond

- a. 500      b. 550      c. 600      d. 650      e. 700

10. A 1000 par value 4% bond with semiannual coupons matures at the end of 10 years. The bond is callable at 1050 at the ends of years 4 through 6, at 1025 at the end of years 7 through 9, and at 1000 at the end of year 10. Find the maximum price that an investor can pay in order to be certain of obtaining a yield rate of 5% convertible semiannually.

- a. 922      b. 944      c. 959      d. 985      e. 1005

Section 5 Key

1. E

2. C

3. C

4. E

5. D

6. D

7. B

8. E

9. A

10. A