

## Chapter 8 Practice Questions

### Question 8.2

Given the following annual effective spot rates, find the present value of a 3-year bond paying 15% annual coupons and having a par value of \$100.

Time	Annual effective spot
1	7.000%
2	6.000%
3	8.000%

### Question 8.3

Given the ~~yield curve from Question 8.2~~ <sup>bond prices</sup>, calculate the 1-year, 2-year, and 3-year annual effective spot rates.

Maturity	Coupon Rate	Bond \$100 par value price
1	15%	101.8519
2	4%	91.2389
3	20%	125.5085

### Question 8.5

Given the following table of forward rates, find the present value of a 3-year bond paying 15% annual coupons and having a par value of \$100.

$t$	$f_t$
0	7.000%
1	5.009%
2	12.114%

### Question 8.6

Using the spot rates calculated for Question 8.3, calculate the annual forward rates applicable to the first, second and third years:  $f_0$ ,  $f_1$ , and  $f_2$ .

### Question 8.7

Use the par yield curve described by the table below to determine the annual forward rates applicable to the first, second, and third years:  $f_0$ ,  $f_1$ , and  $f_2$ .

Maturity	Annual coupon	Annual effective yield
1	5.000%	5.000%
2	6.500%	6.500%
3	8.500%	8.500%

**Question 8.8**

Given the following forward rates, calculate the 1-year, 2-year, and 3-year spot rates:

$t$	$f_t$
0	7.000%
1	5.009%
2	12.114%

**Question 8.9**

We are given the yields on three bonds that pay annual coupons, but their coupons are unknown.

Maturity	Annual coupon	Annual effective yield
1	X	10.000%
2	Y	10.000%
3	Z	10.000%

Find the 1-year, 2-year, and 3-year spot rates.

**Question 8.10**

Using the information from Question 8.9, find the forward rates applicable to the first, second, and third years:  $f_0$ ,  $f_1$ , and  $f_2$ .

**Question 8.11**

We are given the following prices for bonds paying annual coupons:

Maturity	Annual coupon	Price per \$100 of par
1	10.000%	106.7961
2	2.000%	94.4588
3	8.000%	100.7571

Find the price of a 3-year bond with annual coupons of 12% and \$100 of par value.

**Question 8.12**

The table below provides the prices of 5 zero-coupon bonds:

Maturity	Price per \$100 of par
1	97.0874
2	90.7029
3	81.6298
4	73.5030
5	64.2529

Determine the value of  $f_3$ , the annual effective forward rate applicable from time 3 to time 4.

**Question 8.13**

The 1-year spot rate is 5%. The forward rate applicable to the time interval beginning at time 1 and ending at time 2 is 7%. The annual effective yield on a 3-year bond priced at par and having annual coupons is 8%.

Find the 3-year spot rate.

**Chapter 8: The term structure of interest rates**

Q8.2: \$118.66

Q8.3: The 1-year annual effective spot rate is 8.0%.  
The 2-year annual effective spot rate is 9.0%.  
The 3-year annual effective spot rate is 10.0%.

Q8.5: \$118.66

Q8.6: The annual forward rate applicable for the first year is 8.0%.  
The annual forward rate applicable for the second year is 10.009%.  
The annual forward rate applicable for the third year is 12.028%.

Q8.7: The annual forward rate applicable for the first year is 5.0%.  
The annual forward rate applicable for the second year is 8.122%.  
The annual forward rate applicable for the third year is 13.212%.

Q8.8: The 1-year spot rate is 7.0%.  
The 2-year spot rate is 6.0%.  
The 3-year spot rate is 8.0%.

Q8.9: The 1-year spot rate is 10.0%.  
The 2-year spot rate is 10.0%.  
The 3-year spot rate is 10.0%.

Q8.10: The forward rate applicable for the first year is 10.0%.  
The forward rate applicable for the second year is 10.0%.  
The forward rate applicable for the third year is 10.0%.

Q8.11: \$111.44

Q8.12: 11.0564%