FIP Assignment Solution

1. The effective annual yield on the semi-annual coupon bonds is 8.16%. If the annual
coupon bonds are to sell at par, they must offer the same yield, which will require an
annual coupon of 8.16%

2.
(a)
r1 = 100/106.8-1 = 3%

(b)
f2= (1+R2)   2/(1+R1)-1=50%

3.
a. Price=present value of cash flows =100 1+r/1+r + 100 (1+r)2/(1+r)2 + 100 (1+r)3/(1+r)3 = 400
b. Duration = (1+2+3+4)/4 = 2.5 years

4.
(b) the entire value of the treasury strip is in the

principal repayment in the distant
future; it has the highest duration and is most
sensitive to a change in the interest
rate.
(c) despite having the same maturity as (b), (c) has
5.5% coupon payments that
dampen its sensitivity to interest rate changes.
(d) higher coupon payment → lower duration
(a) T-bills are only for 1 to 6 months; they have the
smallest duration.

5.

a. The current price of the bond is
$P0 = 60*1.065 + 60*1.0652 + 1060*1.0653 =$
$\$986.76$
You can sell it one year for
$P1 = 60*1.065 + 1060*1.0652 = \$990.90$
But there is also the $60 of coupon. So the total
return is
$(990.9 + 60)/986.76 - 1 = 6.5\%$

6. The bond now has the same coupon rate as the

yield to maturity so it is trading
at par.
So the new price $P1 = \$1,000$ and rate of return
$= 1000+60/986.76 - 1 = 7.4\%$

6.
If the underwriter purchases the bonds from the corporate client, then it assumes the full risk of being unable to resell the bonds at the stipulated offering price. In other words, the underwriter bears the risk of interest rate movement between the time of purchase and the time of resale. For long maturity bonds, it is generally true that its duration is also long.
Thus, bonds with long maturities are more exposed to interest rate movement risk.
Therefore, the underwriter demands a larger spread (higher underwriting fees) between the purchase price and stipulated offering price.

7.
One would disagree with the statement: "The price of a floater will always trade at its par value."
First, the coupon rate of a floating-rate security (or

floater) is equal to a reference
rate plus some spread or margin. for example, the coupon rate of a floater can reset
at the rate on a three-month Treasury bill (the reference rate) plus 50 basis points
(the spread).
Next, the price of a floater depends on two factors: (1) the spread over the reference
rate and (2) any restrictions that may be imposed on the resetting of the coupon
rate. for example, a floater may have a maximum coupon rate called a cap or a
minimum coupon rate called a floor. The price of a floater will trade close to its par
value as long as (1) the spread above the reference rate that the market requires is
unchanged and (2) neither the cap nor the floor is reached.
However, if the market requires a larger (smaller) spread, the price of a floater will
trade below (above) par. If the coupon rate is restricted from changing to the
reference rate plus the spread because of the cap, then the price of a floater will
trade below par.

8. Don't know the answer.

9.

The total coupon payments plus the interest on interest, assuming an annual reinvestment rate of 9.4%, or 4.7% every six months. The coupon payments are $45 every six months for five years or ten periods (the planned investment horizon).

the total coupon interest plus interest on interest is

C [(1+ r) n − 1 r] = $45 [(1.047) 10 − 1 0.047] = $45[12.40162] = $558.14

The projected sale price at the end of five years, assuming that the required yield to maturity for two-year bonds is 11.2%, is accomplished by calculating the present value of four coupon payments of $45 plus the present value of the maturity value of $1,000.

Projected sale price=present value of coupon payments + present value of par value

C [(1 − 1 (1 + r) n r] [M(1 + r) n] =

$45 [(1 − 1 (1.056) 4 0.056] [1000 (1.056) 4]

= $45[3.4970813] + $1000[0.8041634] =

$157.37 + $804.16 = $961.53

Total future dollars=4558.14+$961.53=$1519.67
Semiannual return = [otal future dollars/ purchase price of dollars]- 1

Annual return = 2* semiannual return = 8.55%

10.
For zero-coupon bonds, none of the bond's total dollar return is dependent on the
interest-on-interest component, so a zero-coupon bond has zero reinvestment risk if
held to maturity. The yield earned on a zero-coupon bond held to maturity is equal
to the promised yield-to-maturity. This is because whenever one can reinvest the
coupon payments at the yield to maturity, the total return will be the same as yield to
maturity.
Total return = 8%

11.
The price responsiveness of a zero-coupon bond is different as yields change. Like

other bonds, zero-coupon bonds have greater price responsiveness for changes at
higher levels of maturity as interest rates change. Like other bonds, zero-coupon
bonds also have greater price responsiveness for changes at lower levels of interest
rates compared to higher levels of interest rates. Except for long-maturity deep-discount bonds, bonds with lower coupon rates will
have greater modified and Macaulay durations. Also, for a given yield and maturity,
zero-coupon bonds have higher convexity and thus greater price responsiveness to
changes in yields.

12.
The Macaulay duration is equal to the modified duration times one plus the yield.
Rearranging this expression gives:

modified duration = Macaulay Duration
(1 + y)

It follows that the modified duration will approach equality with the Macaulay duration as
yields approach zero. Thus, if by low interest rates

one means rates approaching zero, then one would agree with the statement.

13.

If the two bonds have the same dollar duration then their percentage change in price is the same. This implies they will have the same dollar price sensitivity. This possibility is seen from the following equation:

$$dP/dy = -(\text{modified duration})P$$

where the expression on the right-hand side is the estimated dollar duration. By having the same dollar duration, price (P), and yield, we see they can have the same price change (dP) for a given change in yield (dy). Thus, their dollar price change or dollar price sensitivity can be the same.

15.

a. The yield curve is the graphical depiction of the relationship between the yield on bonds of the same credit quality but different maturities. The yield curve is usually constructed from observations of prices and yields in the Treasury market.

6. The Treasury yield curve is the yield curve most closely watched by market
participants for several reasons. first, Treasury securities are free from
default risk and so differences in credit worthiness do not affect yields
making these instruments directly comparable. Second, the Treasury market is the largest and most active bond market offering the fewest
problems in terms of illiquidity and infrequent trading.