1] The effective annual yield on the semi-annual coupon bond 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) $r1 = (110/106.8) - 1 = 3.00\%$
$101.93 = [5/(1 + r1)] + [105/(1 + r2)^2] \Rightarrow r2 = 4.00\%$
$111.31 = [10/(1 + r1)] + [10/(1 + r2)^2] + [110/(1 + r3)^3] \Rightarrow r3 = 6.00\%$

(b) $f2 = [(1 + r2)^2] / [(1 + r1) - 1] = 5.0\%$

3] (a) Price = PV of cash flows = $100(1 + r)/(1+r) + 100(1 + r)^2/(1 + r)^2 + \cdots = 400.00$

(b) Duration = $(1 + 2 + 3 + 4)/4 = 2.5$ years

(c) Put 50% in each. Then the duration of your liability = 2.5 = duration of your assets = 0.5(1)+0.5(4)

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.

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] Disagree: floater moves with market rates.

8]a) We have a 10-year 6% coupon bond with a par value of $1,000 and a required yield of 15%. Given C = 0.06($1,000) / 2 = $30, n = 2(10) = 20 and r = 0.15 / 2 = 0.075, the present value of the coupon payments is: $305.835
The present value of the par or maturity value of $1,000 is:
235.413. Thus, the price of the bond (P) = $305.835 + $235.413 = $541.25.

b) if 15% = Thus, the price of the bond (P) = $305.835 + $235.413 = $541.25.
if 16% =Thus, the price of the bond (P) = $294.544 + $214.548= $509.09.
(509.09 - 541.25)/541.25 = -5.9%

c) We have a 10-year 6% coupon bond with a par value of $1,000 and a required yield of 5%. Given C = 0.06($1,000) / 2 = $30, n = 2(10) = 20 and r = 0.05 / 2 = 0.025

Thus, the price of the bond (P) = $467.675 + $610.271 = $1,077.95.

d) The price of the bond (P) = $446.324 + $553.676 = $1,000.00. [NOTE. We already knew the answer would be $1,000 because the coupon rate equals the yield to maturity.]
The bond price falls with the percentage fall equal to ($1,000.00 - $1,077.95) / $1,077.95 = −0.072310 or about -7.23%.

e) We can say that there is more volatility in a low-interest-rate environment because there was a greater fall (-7.23% versus -5.94%).

9] Step 1: Compute 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). Applying equation (3.7), the total coupon interest plus interest on interest is

= 45[{(1.047)^10 - 1}/.047 = 45(12.40162) = $558.14

Step 2: Determining 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, discounted at 5.6%. As seen below, the projected sale price is $961.53.

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] = 961.53

Step 3: Adding the amounts in steps 1 and 2 gives total future dollars of
$558.14 + $961.53 = $1,519.67.

Step 4: To obtain the semi-annual total return, compute the following:

[total future dollars / purchase price of bonds]^1/n - 1
=[1519.67/1000]^1/10 - 1
=1.042738 - 1 = 0.042738
or 4.2738%

Step 5: Double 4.2738%, for a total return of about 8.55%.

10] Total return will be the same as the yield to maturity. Thus, the total return is 8%.

11] Agree: because when a bond has no coupon, the duration is equal to its maturity. Therefore, the effect on price will be the same regardless of interest rates.

12] Agree: When interest rates are low, Macaulay is barely affected (look at the equation)

13] Duration does a good job of estimating an asset's percentage price change for a small change in yield. However, it does not do as good a job for a large change in yield. The percentage price change due to convexity can be used to supplement the approximate price change using duration.

14] a. The portfolio duration is 9.06 as shown below:

Bond	Market Value	Percentage of Portfolio	Duration	Percent × Duration = Contribution to Portfolio Duration
A	$13,000,000	9%	3	0.28
B	$27,000,000	19%	7	1.35
C	$60,000,000	43%	8	3.43
D	$40,000,000	29%	14	4.00
Portfolio	$140,000,000	100%		9.06

b. If interest rates change by 50 basis points, the portfolio will change by approximately 4.53%.

c. The contribution to portfolio duration for each bond is shown in the last column of the above table.

d. The assumption is that the interest rates for all bonds change by the same number of basis points.

15]a) The graphical depiction of the relationship between the yield on bonds of the same credit quality but different maturities. Usually constructed from observations of prices and yields in the Treasury market.

b) Treasury securities are free from default risk. The Treasury market is the largest and most active bond market offering the fewest problems in terms of illiquidity and infrequent trading.