

## Chapter 11 Managing Bond Portfolios

1. The percentage bond price change is: 3.27% decline
  
2. Computation of duration:
  - a. YTM = 6%  
  
Duration = 2.833 years
  
  - b. YTM = 10%  
  
Duration = 2.824 years, which is less than the duration at the YTM of 6%
  
3. Computation of duration, interest rate = 10%:  
Duration = 1.9524 years
  
5. The percentage bond price change will be: 0.463% increase
  
6.
  - a. Bond B has a higher yield to maturity than bond A since its coupon payments and maturity are equal to those of A, while its price is lower. (Perhaps the yield is higher because of differences in credit risk.) Therefore, the duration of Bond B must be shorter.
  
  - b. Bond A has a lower yield and a lower coupon, both of which cause it to have a longer duration than that of Bond B. Moreover, Bond A cannot be called. Therefore, the maturity of Bond A is at least as long as that of Bond B, which implies that the duration of Bond A is at least as long as that of Bond B.
  
7. C: Highest maturity, zero coupon  
D: Highest maturity, next-lowest coupon  
A: Highest maturity, same coupon as remaining bonds  
B: Lower yield to maturity than bond E  
E: Highest coupon, shortest maturity, highest yield of all bonds.

8.

a. Modified duration =  $\frac{\text{Macaulay duration}}{1 + \text{YTM}}$

If the Macaulay duration is 10 years and the yield to maturity is 8%, then the modified duration is:  $10/1.08 = 9.26$  years

- b. For option-free coupon bonds, modified duration is better than maturity as a measure of the bond's sensitivity to changes in interest rates. Maturity considers only the final cash flow, while modified duration includes other factors such as the size and timing of coupon payments and the level of interest rates (yield to maturity). Modified duration, unlike maturity, tells us the approximate proportional change in the bond price for a given change in yield to maturity.
- c. i. Modified duration increases as the coupon decreases.  
ii. Modified duration decreases as maturity decreases.