Association of International Wealth Management of India

Mock Test 2

QUESTIONS:

1. Sysco Foods has a 10-year bond outstanding with an annual coupon of 6.5%. If the bond is currently priced at $1,089.25, which of the following is closest to the semi-annual-bond basis yield?
   A) 5.33%.
   B) 5.26%.
   C) 5.42%.

2. The margin above or below LIBOR that is used to determine a floating-rate note's coupon payments is most accurately described as its:
   A) Quoted margin.
   B) Discount margin.
   C) Required margin.

3. A bond-equivalent yield for a money market instrument is a(n):
   A) Add-on yield based on a 365-day year.
   B) Discount yield based on a 360-day year.
   C) Discount yield based on a 365-day year.

4. Whitetail Company issues 73-day commercial paper that will pay $1,004 at maturity per $1,000 face value. The bond-equivalent yield is closest to:
   A) 1.97%.
   B) 2.00%.
   C) 2.02%.

5. An investor buys a pure-discount note that matures in 146 days for $971. The bond-equivalent yield is closest to:
   A) 7.5%.
   B) 1.2%.
   C) 3.0%.

6. A spot rate curve is most accurately described as yields to maturity for:
   A) Zero-coupon bonds.
   B) Government bonds.
   C) Money market securities.

7. A yield curve for coupon bonds is composed of yields on bonds with similar:
   A) Maturities.
   B) Issuers.
   C) Coupon rates.

8. The Treasury spot rate yield curve is closest to which of the following curves?
   A) Par bond yield curve.
   B) Zero-coupon bond yield curve.
   C) Forward yield curve rate.

9. The six-year spot rate is 7% and the five-year spot rate is 6%. The implied one-year forward rate five years from now is closest to:
   A) 12.0%.
   B) 6.5%.
   C) 5.0%.

10. Given the one-year spot rate S1 = 0.06 and the implied 1-year forward rates one, two, and three years from now of: 1y1y = 0.062; 2y1y = 0.063; 3y1y = 0.065, what is the theoretical 4-year spot rate?
    A) 6.75%
    B) 6.25%
    C) 6.00%

11. The one-year spot rate is 6% and the one-year forward rates starting in one; two and three years respectively are 6.5%, 6.8% and 7%. What is the four-year spot rate?
    A) 6.51%
    B) 6.58%
    C) 6.57%

12. The one-year spot rate is 5% and the two-year spot rate is 6.5%. What is the one-year forward rate starting one year from now?
    A) 8.02%.
    B) 5.00%.
    C) 7.87%.

13. Suppose the 3-year spot rate is 12.1% and the 2-year spot rate is 11.3%. Which of the following statements concerning forward and spot rates is most accurate? The 1-year:
    A) Forward rate two years from today is 13.2%.
    B) Forward rate one year from today is 13.7%.
    C) Forward rate two years from today is 13.7%.

14. The 3-year spot rate is 10%, and the 4-year spot rate is 10.5%. What is the 1-year forward rate 3 years from now?
    A) 12.0%
    B) 10.0%
    C) 11.0%

15. An investor purchases a 4-year, 6%, semi-annual-pay Treasury note for $9,485. The security has a par value of $10,000. To realize a total return equal to 7.515% (its yield to maturity), all payments must be reinvested at a return of:
    A) More than 7.515%.
    B) 7.515%.
    C) Less than 7.515%.

16. All else being equal, which of the following bond characteristics will lead to lower levels of coupon reinvestment risk for bonds that are held to maturity?
    A) Longer maturities and higher coupon levels.
    B) Shorter maturities and lower coupon levels.
    C) Shorter maturities and higher coupon levels.

17. If the coupon payments are reinvested at the coupon rate during the life of a bond, then the yield to maturity:
    A) Is less than the realized yield?
    B) May be greater or less than the realized yield.
    C) Is greater than the realized yield.

18. When computing the yield to maturity, the implicit reinvestment assumption is that the interest payments are reinvested at the:
    A) Yield to maturity at the time of the investment.
    B) Prevailing yield to maturity at the time interest payments are received.
    C) Coupon rate.

19. A non-callable bond with seven years remaining to maturity is trading at 108.1% of a par value of $1,000 and has an 8.5% coupon. If interest rates rise 50 basis points, the bond's price will fall to 105.3% and if rates fall 50 basis points, the bond's price will rise to 111.0%. Which of the following is closest to the effective duration of the bond?
    A) 6.12
    B) 5.27
    C) 5.54

20. A bond with a yield to maturity of 8.0% is priced at 96.00. If its yield increases to 8.3% its price will decrease to 94.06. If its yield decreases to 7.7% its price will increase to 98.47. The modified duration of the bond is closest to:
    A) 7.66
    B) 2.75
    C) 4.34

21. A bond's yield to maturity decreases from 8% to 7% and its price increases by 6%, from $675.00 to $715.50. The bond's effective duration is closest to:
    A) 6.0
    B) 7.0
    C) 5.0

22. When compared to modified duration, effective duration:
    A) Is equal to modified duration for callable bonds but not puttable bonds.
    B) Places less weight on recent changes in the bond's ratings.
    C) Factors in how embedded options will change expected cash flows.

23. Effective duration is more appropriate than modified duration as a measure of a bond's price sensitivity to yield changes when:
    A) The bond contains embedded options.
    B) The bond has a low coupon rate and a long maturity.
    C) Yield curve changes are not parallel.

24. Holding other factors constant, the interest rate risk of a coupon bond is higher when the bond's:
    A) Yield to maturity is lower.
    B) Current yield is higher.
    C) Coupon rate is higher.

25. In comparing the price volatility of puttable bonds to that of option-free bonds, a puttable bond will have:
    A) Less price volatility at higher yields.
    B) Less price volatility at low yields.
    C) More price volatility at higher yields.

26. Which of the following bonds is most likely to exhibit the greatest volatility due to interest rate changes? A bond with a:
    A) High coupon and a long maturity.
    B) Low coupon and a short maturity.
    C) Low coupon and a long maturity.

27. When interest rates increase, the modified duration of a 30-year bond selling at a discount:
    A) Increases.
    B) Does not change.
    C) Decreases.

28. Which of the following statements concerning the price volatility of bonds is most accurate?
    A) Bonds with longer maturities have lower interest rate risk.
    B) As the yield on callable bonds approaches the coupon rate, the bond's price will approach a "floor" value.
    C) Bonds with higher coupons have lower interest rate risk.

29. Which of the following five year bonds has the highest interest rate sensitivity?
    A) Floating rate bond.
    B) Zero-coupon bond.
    C) Option-free 5% coupon bond.

30. Which of the following bonds has the highest interest rate sensitivity? A:
    A) Ten year, option-free 4% coupon bond.
    B) Ten year, option-free 6% coupon bond.
    C) Five year, 5% coupon bond callable in one year.

31. Which of the following bonds has the shortest duration? A bond with a:
    A) 20-year maturity, 6% coupon rate.
    B) 10-year maturity, 10% coupon rate.
    C) 10-year maturity, 6% coupon rate.

32. Donald McKay, is analysing a client's fixed income portfolio. As of the end of the last quarter, the portfolio had a market value of $7,545,000 and portfolio duration of 6.24. McKay is predicting that the yield for all of the securities in the portfolio will decline by 25 basis points next quarter. If McKay's prediction is accurate, the market value of the portfolio:
    A) Will increase by approximately 6.24%.
    B) At the end of the next quarter will be approximately $7,427,300.
    C) Will increase by approximately $117,700.

33. Which of the following is a limitation of the portfolio duration measure? Portfolio duration only considers:

A) The market values of the bonds.

B) A nonparallel shift in the yield curve.

C) A linear approximation of the actual price-yield functions for the portfolio.

34. A $100,000 par value bond has a full price of $993,000, Macaulay duration of 6.5, and an annual modified duration of 6.1. The bond's money duration per $100 par value is closest to:

A) $6.06.

B) $606.

C) $645

35. Which of the following is most likely to be the money duration of newly issued 360-day euro commercial paper?

A) 25 million.

B) 360 days.

C) 4.3%.

36. Which of the following statements best describes the concept of negative convexity in bond prices? As interest rates:

A) Fall, the bond's price increases at a decreasing rate.

B) Fall, the bond's price increases at an increasing rate.

C) Rise, the bond's price decreases at a decreasing rate.

37. Negative convexity is most likely to be observed in:

A) Zero coupon bonds.

B) Callable bonds.

C) Government bonds.

38. How does the price-yield relationship for a puttable bond compare to the same relationship for an option-free bond? The price-yield relationship is:
    A) The same for both bond types.
    B) More convex at some yields for the puttable bond.
    C) Negatively convex at some yields for the puttable bond.

39. A $1,000 face, 10-year, 8.00% semi-annual coupon, option-free bond is issued at par (market rates are thus 8.00%). Given that the bond price decreased 10.03% when market rates increased 150 basis points (bp),if market yields decrease by 150 bp, the bond's price will:
    A) Decrease by more than 10.03%.
    B) Increase by 10.03%.
    C) Increase by more than 10.03%.

40. Adjusting for convexity improves an estimated price change for a bond compared to using duration alone because:
    A) The slope of the price/yield curve is not linear.
    B) It measures the volatility of non-callable bonds.
    C) The slope of the callable bond price/yield curve is backward bending at high interest rates.

41. If a put feature expires on a bond so that it becomes option-free, then the curve depicting the price and yield relationship of the bond will become:
    A) More convex.
    B) Less convex.
    C) Inversely convex.

42. How does the price-yield relationship for a callable bond compare to the same relationship for an option-free bond? The price-yield relationship is best described as exhibiting:
    A) Negative convexity for the callable bond and positive convexity for an option-free bond.
    B) Negative convexity at low yields for the callable bond and positive convexity for the option-free bond.
    C) The same convexity for both bond types.

43. For a given change in yields, the difference between the actual change in a bond's price and that predicted using duration alone will be greater for:
    A) A bond with less convexity.
    B) A bond with greater convexity.
    C) A short-term bond.

44. Which of the following is most accurate about a bond with positive convexity?
    A) Positive changes in yield lead to positive changes in price.
    B) Price increases and decreases at a faster rate than the change in yield.
    C) Price increases when yields drop are greater than price decreases when yields rise by the same amount.

45. An annual-pay bond is priced at 101.50. If its yield to maturity increases 100 basis points, its price will decrease to 105.90. If its yield to maturity increases 100 basis points, its price will decrease to 97.30. The bond's approximate modified convexity is closest to:
    A) 0.2
    B) 4.2
    C) 19.7

46. A bond is priced at 95.80. Using a pricing model, an analyst estimates that a 25 bp parallel upward shift in the yield curve would decrease the bond's price to 94.75, while a 25 bp parallel downward shift in the yield curve would increase its price to 96.75. The bond's effective convexity is closest to:

    A) 4

    B) 167

    C) 3340

47. A non-callable bond has a modified duration of 7.26. Which of the following is the closest to the approximate price change of the bond with a 25 basis point increase in rates?

    A) -0.018%.

    B) 1.820%.

    C) -1.820%.

48. If a Treasury bond has an annual modified duration of 10.27 and an annual convexity of 143, which of the following is closest to the estimated percentage price change in the bond for a 125 basis point increase in interest rates?

    A) -11.72%.

    B) -13.96%.

    C) -13.96%.

49. Consider a bond with modified duration of 5.61 and convexity of 43.84. Which of the following is closest to the estimated percentage price change in the bond for a 75 basis point decrease in interest rates?

    A) 4.21%.

    B) 4.33%.

    C) 4.12%.

50. A bond has a convexity of 51.44. What is the approximate percentage price change of the bond due to convexity if rates rise by 150 basis points?
    A) 0.71%.
    B) 0.58%.
    C) 0.26%.

51. Jayce Arnold, a candidate, considers a $1,000 face value, option-free bond issued at par. Which of the following statements about the bond's dollar price behaviour is most likely accurate when yields rise and fall by 200 basis points, respectively? Price will:
    A) Decrease by $124, price will increase by $149.
    B) Increase by $149, price will decrease by $124.
    C) Decrease by $149, price will increase by $124.

52. For a given bond, the duration is 8 and the convexity is 100. For a 60 basis point decrease in yield, what is the approximate percentage price change of the bond?
    A) 4.62%.
    B) 2.52%.
    C) 4.98%.

53. A bond has duration of 10.62 and a convexity of 182.92. For a 200 basis point increase in yield, what is the approximate percentage price change of the bond?
    A) -24.90%.
    B) -17.58%.
    C) -1.62%.

54. Assume that a straight bond has duration of 1.89 and a convexity of 32. If interest rates decline by 1% what is the total estimated percentage price change of the bond?
    A) 1.56%.
    B) 1.56%.
    C) 1.89%.

55. A bond's duration is 4.5 and its convexity is 87.2. If interest rates rise 100 basis points, the bond's percentage price change is closest to:
    A) -4.50%.
    B) -4.06%
    C) -4.94%.

56. If the term structure of yield volatility slopes upward:
    A) Forward interest rates are higher than spot interest rates.
    B) Long-term interest rates are more variable than short-term interest rates.
    C) Short-term interest rates are less than long-term interest rates.

57. The term structure of yield volatility illustrates the relationship between yield volatility and:
    A) Time to maturity.
    B) Yield to maturity.
    C) Macaulay duration.

58. Which measure of duration should be matched to the bondholder's investment horizon so that reinvestment risk and market price risk offset each other?
    A) Modified duration
    B) Macaulay duration.
    C) Effective duration.

59. An investor buys a bond that has a Macaulay duration of 3.0 and a yield to maturity of 4.5%. The investor plans to sell the bond after three years. If the yield curve has a parallel downward shift of 100 basis points immediately after the investor buys the bond, her annualized horizon return is most likely to be:

A) Less than 4.5%.

B) Greater than 4.5%.

C) Approximately 4.5%.

60. An investor who buys bonds that have a Macaulay duration less than his investment horizon:

A) Is minimizing reinvestment risk

B) Has a negative duration gap.

C) Will benefit from decreasing interest rates.

ANSWERS:

61 (B)

Reason: First, find the annual yield to maturity of the bond as: FV = $1,000; PMT = $65; N = 10; PV = -1,089.25; CPT → I/Y = 5.33%. Then, find the semi-annual-bond basis yield as: 2 X [(1 + 0.0533)0.5 - 1] = 0.0526 = 5.26%.

62 (A)

Reason: The quoted margin of a floating-rate note is the number of basis points added to or subtracted from the note's reference rate to determine its coupon payments. The required margin or discount margin is the number of basis points above or below the reference rate that would cause the note's price to return to par value at each reset date. Required margin may be different from quoted margin if a note's credit quality has changed since issuance.

63 (A)

Reason: A bond-equivalent yield is an add-on yield based on a 365-day year.

64 (B)

Reason: The add-on yield for the 73-day holding period is $1,004 / $1,000 − 1 = 0.4%. The bond-equivalent yield, which is an add-on yield based on a 365-day year, is (365 / 73) × 0.4% = 2.0%.

65 (A)

Reason: The equivalent add-on return the investor earns for the 146-day holding period is $1,000 / $971 − 1 = 0.0299 = 2.99%. The bond-equivalent yield is (365 / 146) × 2.99% = 7.47%.

66 (A)

Reason: A spot rate curve illustrates the yields for single payments to be made in various future periods, including short-term and long-term periods.

67 (B)

Reason: Yield curves are typically constructed for bonds of the same or similar issuers, such as a government bond yield curve or AA rated corporate bond yield curve.

68 (B)

Reason: The spot rate yield curve shows the appropriate rates for discounting single cash flows occurring at different times in the future. Conceptually, these rates are equivalent to yields on zero-coupon bonds. The par bond yield curve shows the YTMs at which bonds of various maturities would trade at par value. Forward rates are expected future short-term rates.

69 (A)

Reason: 5y1y= [(1 + S6)6 / (1 + S5)5] - 1 = [(1.07)6/(1.06)5] - 1 = [1.5 / 1.338] - 1 = 0.12.

70 (B)

Reason: S4 = [(1.06) (1.062) (1.063) (1.065)].25 − 1 = 6.25%.

71 (C)

Reason: The four-year spot rate is computed as follows: Four-year spot rate = [(1 + 0.06)(1 + 0.065)(1 + 0.068)(1 + 0.07)]1/4 - 1 = 6.57%

72 (A)

Reason: The forward rate is computed as follows: One-year forward rate = 1.0652 / 1.05 - 1 = 8.02%

73 (C)

Reason: The equation for the three-year spot rate, S3, is (1 + S1)(1 + 1y1y)(1 + 2y1y) = (1 + S3)3. Also, (1 + S1)(1 + 1y1y) = (1 + S2)2. So, (1 + 2y1y) = (1 + S3)3 / (1 + S2)2, computed as: (1 + 0.121)3 / (1 + 0.113)2 = 1.137. Thus, 2y1y = 0.137, or 13.7%.

74 (A)

Reason: [(1 + S4)4 / (1 + S3)3] − 1 = 12.01% = 12%.

75 (B)

Reason: The reinvestment assumption that is embedded in any present value-based yield measure implies that all coupons and principal payments must be reinvested at the specific rate of return, in this case, the yield to maturity. Thus, to obtain a 7.515% total dollar return, the investor must reinvest all the coupons at a 7.515% rate of return. Total dollar return is made up of three sources, coupons, principal, and reinvestment income.

76 (B)

Reason: Other things being equal, the amount of reinvestment risk embedded in a bond will decrease with lower coupons because there will be a lesser dollar amount to reinvest and with shorter maturities because the reinvestment period is shorter.

77 (B)

Reason: For the realized yield to equal the YTM, coupon reinvestments must occur at that YTM. Whether reinvesting the coupons at the coupon rate will result in a realized yield higher or lower than the YTM depends on whether the bond is at a discount (coupon < YTM) or a premium (coupon>YTM).

78 (A)

Reason: The reinvestment assumption states that reinvestment must occur at the YTM in order for an investor to earn the YTM. The assumption also states that payments are received in a prompt and timely fashion resulting in immediate reinvestment of those funds.

79 (B)

Reason: The formula for effective duration is: (V- - V+) / (2V0Δcurve). Therefore, effective duration is: ($1.110 - $1.053) / (2 * $1.081 * 0.005) = 5.27.

80 (A)

Reason: The change in the yield is 30 basis points. Approximate modified duration = (98.47 − 94.06) / (2 X 96.00 X 0.003) = 7.6563.

81 (A)

Reason: Effective duration is the percentage change in price for a 1% change in yield, which is given as 6.

82 (C)

Reason: Effective duration considers expected changes in cash flow from features such as embedded options.

83 (A)

Reason: Effective duration takes into consideration embedded options in the bond. Modified duration does not consider the effect of embedded options. For option-free bonds, modified duration will be similar to effective duration. Both duration measures are based on the value impact of a parallel shift in a flat yield curve.

84 (A)

Reason: In this case the only determinant that will cause higher interest rate risk is having a low yield to maturity. A higher coupon rate and a higher current yield will result in lower interest rate risk.

85 (A)

Reason: The only true statement is that puttable bonds will have less price volatility at higher yields. At higher yields the put becomes more valuable and reduces the decline in price of the puttable bond relative to the option-free bond. On the other hand, when yields are low, the put option has little or no value and the puttable bond will behave much like an option-free bond. Therefore at low yields a puttable bond will not have more price volatility nor will it have less price volatility than a similar option-free bond.

86 (C)

Reason: Other things equal, a bond with a low coupon and long maturity will have the greatest price volatility.

87 (C)

Reason: The higher the yield on a bond the lower the price volatility (duration) will be. When interest rates increase the price of the bond will decrease and the yield will increase because the current yield = (annual cash coupon payment) / (bond price). As the bond price decreases the yield increases and the price volatility (duration) will decrease.

88 (C)

Reason: Other things equal, bonds with higher coupons have lower interest rate risk. Note that the other statements are false. Bonds with longer maturities have higher interest rate risk. Callable bonds have a ceiling value as yields decline.

89 (B)

Reason: The Macaulay duration of a zero-coupon bond is equal to its time to maturity. Its price is greatly affected by changes in interest rates because its only cash-flow is at maturity and is discounted from the time at maturity until the present.

90 (A)

Reason: If two bonds are identical in all respects except their term to maturity, the longer term bond will be more sensitive to changes in interest rates. All else the same, if a bond has a lower coupon rate when compared with another, it will have greater interest rate risk. Therefore, for the option-free bonds, the 10 year 4% coupon is the longest term and has the lowest coupon rate. The call feature does not make a bond more sensitive to changes in interest rates, because it places a ceiling on the maximum price investors will be willing to pay. If interest rates decrease enough the bonds will be called.

91 (B)

Reason: All else constant, a bond with a longer maturity will be more sensitive to changes in interest rates. All else constant, a bond with a lower coupon will have greater interest rate risk.

92 (C)

Reason: A portfolio's duration can be used to estimate the approximate change in value for a given change in yield. A critical assumption is that the yield for all bonds in the portfolio change by the same amount, known as a parallel shift. For this portfolio the expected change in value can be calculated as: $7,545,000 × 6.24 × 0.0025 = $117,702. The decrease in yields will cause an increase in the value of the portfolio, not a decrease.

93 (C)

Reason: Duration is a linear approximation of a nonlinear function. The use of market values has no direct effect on the inherent limitation of the portfolio duration measure. Duration assumes a parallel shift in the yield curve, and this is an additional limitation.

94 (B)

Reason: Money duration per $100 par value = annual modified duration X full price per $100 par value = 6.1 X $99.30 = $605.73

95 (A)

Reason: Money duration is expressed in currency units.

96 (A)

Reason: Negative convexity occurs with bonds that have prepayment/call features. As interest rates fall, the borrower/issuer is more likely to repay/call the bond, which causes the bond's price to approach a maximum. As such, the bond's price increases at a decreasing rate as interest rates decrease.

97 (B)

Reason: All non-callable bonds exhibit the trait of being positively convex. Callable bonds have negative convexity because once the yield falls below a certain point prices will rise at a decreasing rate, thus giving the price-yield relationship a negative convex shape.

98 (B)

Reason: Since the holder of a puttable has an incentive to exercise his put option if yields are high and the bond price is depressed, this puts a lower limit on the price of the bond when interest rates are high. The lower limit introduces a higher convexity of the puttable bond compared to an option-free bond when yields are high.

99 (C)

Reason: Because of positive convexity, (bond prices rise faster than they fall) for any given absolute change in yield, the increase in price will be more than the decrease in price for a fixed-coupon, non-callable bond. As yields increase, bond prices fall, and the price curve gets flatter, and changes in yield have a smaller effect on bond prices. As yields decrease, bond prices rise, and the price curve gets steeper, and changes in yield have a larger effect on bond prices. Here, for an absolute 150bp change, the price increase would be more than the price decrease.

100 (A)

Reason: Modified duration is a good approximation of price changes for an option-free bond only for relatively small changes in interest rates. As rate changes grow larger, the curvature of the bond price/yield relationship becomes more prevalent, meaning that a linear estimate of price changes will contain errors. The modified duration estimate is a linear estimate, as it assumes that the change is the same for each basis point change in required yield. The error in the estimate is due to the curvature of the actual price path. This is the degree of convexity. If we can generate a measure of this convexity, we can use this to improve our estimate of bond price changes.

101(B)

Reason: When the option expires, the prices at the lower end of the curve will become lower. This will make the curve less convex.

102 (B)

Reason: Since the issuer of a callable bond has an incentive to call the bond when interest rates are very low in order to get cheaper financing, this puts an upper limit on the bond price for low interest rates and thus introduces negative convexity between yields and prices.

103 (B)

Reason: Duration is a linear measure of the relationship between a bond's price and yield. The true relationship is not linear as measured by the convexity. When convexity is higher, duration will be less accurate in predicting a bond's price for a given change in interest rates. Short-term bonds generally have low convexity.

104 (C)

Reason: A convex price/yield graph has a larger increase in price as yield decreases than the decrease in price when yields increase.

105 (C)

Reason: Approximate modified convexity is calculated as [V- + V+ - 2V0] / [(V0) (change in curve) 2]. [105.90 + 97.30 - 2(101.50)] / [101.50(0.01)2] = 19.70.

106 (B)

Reason: Approximate effective convexity is calculated as [V- + V+ - 2V0] / [(V0) (change in curve) 2]. [96.75 + 94.75 - 2(95.80)] / [(95.80)(0.0025) 2] = 167.01

107 (C)

Reason: The formula for the percentage price change is: - (duration)(ΔYTM). Therefore, the estimated percentage price change using duration is: - (7.26)(0.25%) = -1.82%.

108 (A)

Reason: The estimated percentage price change = the duration effect plus the convexity effect. The formula is: [-duration X (ΔYTM)] + ½[convexity X (ΔYTM)2]. Therefore, the estimated percentage price change is: [-(10.27)(0.0125)] + [(½)(143)(0.0125)2] = -0.128375 + 0.011172 = -0.117203 = -11.72%.

109 (B)

Reason: The estimated percentage price change is equal to the duration effect plus the convexity effect. The formula is: [-duration X (ΔYTM)] + ½[convexity X (ΔYTM)2]. Therefore, the estimated percentage price change is: [-(5.61)(-0.0075)] + [(½)(43.84)(-0.0075)2] = 0.042075 + 0.001233 = 0.043308 = 4.33%.

110 (B)

Reason: The convexity effect, or the percentage price change due to convexity, formula is: convexity Ã— (ΔYTM)2. The percentage price change due to convexity is then: (½)(51.44)(0.015)2 = 0.0058.

111 (A)

Reason: As yields increase, bond prices fall, the price curve gets flatter, and changes in yield have a smaller effect on bond prices. As yields decrease, bond prices rise, the price curve gets steeper, and changes in yield have a larger effect on bond prices. Thus, the price increases when interest rates decline must be greater than the price decrease when interest rates rise (for the same basis point change). Remember that this applies to percentage changes as well.

112 (C)

Reason: The estimated price change is -(duration)(ΔYTM) + (½)(convexity) X (ΔYTM)2 = -8 X (-0.006) + (½)(100) X (-0.0062) = +0.0498 or 4.98%.

113 (B)

Reason: The estimated price change is: -(duration)(ΔYTM) + ½(convexity) X (ΔYTM)2 = -10.62 X 0.02 + (½)(189.92)(0.022) = -0.2124 + 0.0366 = -0.1758 or -17.58%.

114 (B)

Reason: The total percentage price change estimate is computed as follows: Total estimated price change = -1.89 X (-0.01) X 100 + (½)(32) X (-0.01)2 X 100 = 2.05%

115 (B)

Reason: Recall that the percentage change in prices = Duration effect + Convexity effect = [-duration X (change in yields)] + [(½) convexity X (change in yields)2] = (-4.5)(0.01) + (½)(87.2)(0.01)2 = -4.06%. Remember that you must use the decimal representation of the change in interest rates when computing the duration and convexity adjustments.

116 (B)

Reason: If the term structure of yield volatility slopes upward, long-term interest rates are more variable than short-term interest rates.

117 (A)

Reason: The term structure of yield volatility refers to the relationship between yield volatility and time to maturity.

118 (B)

Reason: Macaulay duration is the investment horizon at which reinvestment risk and market price risk approximately offset.

119 (C)

Reason: With Macaulay duration equal to the investment horizon, market price risk and reinvestment risk approximately offset and the annualized horizon return should be close to the yield to maturity at purchase.

120 (B)

Reason: A duration gap is a difference between a bond's Macaulay duration and the bondholder's investment horizon. If Macaulay duration is less than the investment horizon, the bondholder is said to have a negative duration gap and is more exposed to downside risk from decreasing interest rates (reinvestment risk) than from increasing interest rates (market price risk).