

MAP 4170  
Test 3

Name: \_\_\_\_\_  
Date: July 8, 2014

Show sufficient work and clearly mark your answers. Each problem is worth 10 points.

1. A loan is to be repaid with annual payments over 20 years. The first payment is 1000 and subsequent payments are 7.12% greater than the previous payments. The loan interest rate is 3% annual effective. Determine the amount of principal repaid with the 16<sup>th</sup> payment.
  - (A) Less than 2400
  - (B) Greater than or equal to 2400, but less than 2500
  - (C) Greater than or equal to 2500, but less than 2600
  - (D) Greater than or equal to 2600, but less than 2700
  - (E) Greater than or equal to 2700
  
2. A 20-year bond with annual coupons of 50 was bought to yield 5% annual effective. The amount of write-up for the 10<sup>th</sup> year is 7.31. Determine the redemption value.
  - (A) 750
  - (B) 900
  - (C) 1000
  - (D) 1200
  - (E) 1250

3. Eddy purchases a 1000 face value 20-year bond with 6% semiannual coupons and redemption value of 1200 at a price to yield 8% compounded semiannually. Eddy invests each coupon received in an account that pays 10% compounded semiannually. Immediately after receiving the coupon at the end of the 8<sup>th</sup> year, Eddy sells the bond to Greg at a price that yields Eddy 10% per annum over the time in which he owns the bond. Determine the nominal interest rate, payable semiannually, that Greg bought the bond to yield.
- (A) 3%
  - (B) 4%
  - (C) 5%
  - (D) 6%
  - (E) 7%
4. A 1000 face value 30-year callable bond with 4% annual coupons may be called at the end of any year beginning with the 10<sup>th</sup> year. If the bond is called before the 20<sup>th</sup> year, then the redemption value is 1200. If the bond is called at the end of the 20<sup>th</sup> year or before the 30<sup>th</sup> year, then the redemption value is 1100. If not called the bond matures at a redemption value of 1200. The bond is bought at the maximum price that guarantees an annual yield of at least 4%. Determine the annual yield on the bond if the bond was called at the end of the 15<sup>th</sup> year.
- (A) 4.20%
  - (B) 4.35%
  - (C) 4.50%
  - (D) 4.65%
  - (E) 4.80%

5. A 30-year loan at 4% annual effective is repaid with annual payments. The first payment is 1000 and each subsequent payment is 50 more than its preceding payment. Determine the amount of interest paid on the loan during the middle 10-year period of the term of the loan.
- (A) 9000
  - (B) 9200
  - (C) 9400
  - (D) 9600
  - (E) 9800
6. A 20-year 1000 par value bond with 8% semiannual coupons is bought to yield 5% annual effective. Determine the book value of the bond immediately before the 12<sup>th</sup> coupon is paid.
- (A) 1300
  - (B) 1307
  - (C) 1327
  - (D) 1340
  - (E) 1347

7. Dale pays back a 100,000 loan with annual payments over 10 years using the sinking fund method. The lender charges an interest rate of 5% annual effective, and the sinking fund interest rate is 6% annual effective. Dale makes a total annual payment of 12,000 each year. Determine the additional amount necessary at the time of the last scheduled payment in order for Dale to completely pay off the loan.
- (A) 7735
  - (B) 9735
  - (C) 10735
  - (D) 12735
  - (E) 14735
8. Lisa lends Mary 10,000. To repay the loan, Mary makes payments at the end of each year for 10 years. Each payment consists of a principal payment of 1000 plus interest on the unpaid balance at 4%. Lisa invests each payment from Mary into an account that pays 5% annual effective. Determine Lisa's yield rate, as a nominal rate compounded monthly, on the loan.
- (A) 4.32%
  - (B) 4.42%
  - (C) 4.42%
  - (D) 4.52%
  - (E) 4.62%

9. Sara borrows 60,000 at 6% compounded monthly for 5 years. She originally agrees to make level monthly payments of  $X$ . Unfortunately, Sara misses the payments at the end of the 11<sup>th</sup> month up through and including the payment at the end of the 15<sup>th</sup> month. Sara then continues making the scheduled payments of  $X$ . Due to the missed payments, there is a balance on the loan at end of the original 5-year period. Sara agrees to repay this balance with 5 level monthly payments of  $Y$ , with the first payment of  $Y$  being made one month later, and  $Y$  being calculated using an interest rate of 9% compounded monthly. Determine  $Y$ .
- (A) 1160
- (B) 1190
- (C) 1320
- (D) 1490
- (E) 1500
10. A 10-year 100 face value bond with 8% quarterly coupons is bought to yield 4% compounded quarterly for the first 5 years, and 6% compounded quarterly thereafter. The book value immediately after the coupon payment at the end of year 8 is 112.62. Determine the amount of principal adjustment during the 3<sup>rd</sup> year.
- (A) 2.83
- (B) 2.93
- (C) 3.03
- (D) 3.13
- (E) 3.23