

FIN331.101  
Fall 2010 Exam  
Dr. Rhee

NAME \_\_\_\_\_ ID# \_\_\_\_\_

1. Which of followings is NOT the characteristics of a perpetuity?

- a. A perpetuity continues for a fixed time period.
- b. Value of a perpetuity can be calculated as  $PMT/i$
- c. In a perpetuity, returns are earned in the form of a series of cash flows.
- d. A perpetuity is a constant infinite stream of identical cash flows.
- e. Real estate and preferred stock are effectively perpetuities.

**Answer: a**

2. If a security of \$17,200 is worth \$20,390 three years in the future and assuming that no withdrawals or deposits are made, what is the implied interest rate that the investor expects to earn on the security?

- a. 4.19%
- b. 5.84%
- c. 6.78%
- d. 7.82%
- e. 8.24%

**Answer: b**

$N = 3, PV = -17,200, FV = 20,390 \Rightarrow I = 5.8\%$

3. You've decided to buy a house that is valued at \$1 million. You have \$500,000 as a down payment on the house and you take out a mortgage for the rest. Your bank is offering you a 30-year standard mortgage at a fixed nominal rate of 9% or a 15-year mortgage at a fixed nominal rate of 9%. How much larger must your monthly payment would be?

- a. \$1,048.22
- b. \$1,205.45
- c. \$1,519.92
- d. \$1,729.56
- e. \$1,836.69

**Answer: a**

30-year:  $N = 360, I = 9/12, PV = 500,000 \Rightarrow PMT = \$4,023.11$

15-year:  $N = 180, I = 9/12, PV = 500,000 \Rightarrow PMT = \$5,071.33$

Therefore, difference is \$1,048.22

4. How long will it take for you to pay off \$1,000 charged on your credit card, if you plan to make the minimum payment of \$15 per month and the credit card charges 24% per annum?

- a. 10 years
- b. 12 years
- c. 15 years
- d. 17 years
- e. You may not be able to pay off the debt

**Answer: e**

If you use a financial calculator, you may get an error message because \$15 of monthly payment is too small to pay back \$1,000 at 24% per annum. In other words, it takes almost forever to pay back \$1,000 at 24% per annum with monthly payment of \$15.

5. Which of the following investments would have the lowest present value? Assume that the effective annual

rate for all investments is the same and is greater than zero.

- Investment A pays \$250 at the end of every year for the next 10 years (a total of 10 payments).
- Investment B pays \$125 at the end of every 6-month period for the next 10 years (a total of 20 payments).
- Investment C pays \$125 at the beginning of every 6-month period for the next 10 years (a total of 20 payments).
- Investment D pays \$2,500 at the end of 10 years (just one payment).
- Investment E pays \$250 at the beginning of every year for the next 10 years (a total of 10 payments).

**Answer: d**

A is smaller than E and B is smaller than C because the money comes in later. A is smaller than B because a larger annuity is received later. So, now the choice comes down to either A or D. Since all of D is received at the end, this is the logical choice. We could also do these calculations to answer the question:

A	\$1,536.14		EFF%	10.00%	10	250
B	\$1,573.63		NOM%	9.76%		125
C	\$1,650.44					125
D	\$963.86	Smallest				2500
E	\$1,689.76					250

6. Which of the following statements is CORRECT?

- The cash flows for an ordinary annuity all occur at the beginning of the periods.
- If a series of unequal cash flows occurs at regular intervals, such as once a year, then the series is by definition an annuity.
- The cash flows for an annuity due must all occur at the beginning of the periods.
- The cash flows for an annuity may vary from period to period, but they must occur at regular intervals, such as once a year or once a month.
- If some cash flows occur at the beginning of the periods while others occur at the ends, then we have what the textbook defines as a variable annuity.

**Answer: c**

7. You observed an upward-sloping normal yield curve. Which of following statement is the MOST correct?

- Pure expectation theory must be correct.
- There is a positive maturity risk premium.
- If the pure expectation theory is correct, future (short-term) rates are expected to be higher than current (short-term) rates.
- Inflation must be expected to change in the future.
- Default risk premium or liquidity premium must be increasing in the future.

**Answer: c**

8. Suppose the interest rate on a 1-year T-bond is 5.0% and that on a 2-year T-bond is 7.0%. Assuming the pure expectations theory is correct, what is the market's forecast for 1-year rates 1 year from now?

- 7.36%
- 7.75%
- 8.16%
- 8.59%
- 9.04%

**Answer: e**

$$(1 + {}_0R_n)^n = (1 + {}_0R_1) * (1 + {}_1R_2) * (1 + {}_2R_3) * \dots * (1 + {}_{n-1}R_n) * [1 + E({}_nR_n)]$$

$$(1 + {}_0R_2)^2 = (1 + {}_0R_1) * [1 + E({}_1R_2)] \Rightarrow (1.07)^2 = (1.05) * [1 + E({}_1R_2)]$$

$$\Rightarrow E({}_1R_2) = (1.07)^2 / (1.05) - 1 = 9.04\%$$

9. Assume a scenario in which there is no maturity risk premium ( $MRP = 0$ ) and the real risk-free rate is expected to remain constant, and the yield curve is likely to be normal for the next 10 years. Is inflation expected to increase, decrease, or stay the same over the next 10 years?
- Stay the same
  - Decrease
  - Increase
  - Increase at first and then decrease
  - None of above

**Answer: c**

10. Crockett Corporation's 5-year bonds yield 6.65%, and 5-year T-bonds yield 4.75%. The real risk-free rate is  $r^* = 3.60\%$ , the default risk premium for Crockett's bonds is  $DRP = 1.00\%$  versus zero for T-bonds, the liquidity premium on Crockett's bonds is  $LP = 0.90\%$  versus zero for T-bonds, and the maturity risk premium for all bonds is found with the formula  $MRP = (t - 1) \times 0.1\%$ , where  $t =$  number of years to maturity. What inflation premium (IP) is built into 5-year bond yields?
- 0.68%
  - 0.75%
  - 0.83%
  - 0.91%
  - 1.00%

**Answer: b**

Basic equation:  $r = r^* + IP + MRP + DRP + LP$

$r_{\text{Crockett}}$	Not needed in this problem	6.35%
LP	Not needed in this problem	0.90%
DRP	Not needed in this problem	1.00%
$r_{\text{T-bond}}$	Required data	4.75%
$r^*$	Required data	3.60%
Years to maturity	Required data	5
$MRP = (t - 1) \times (0.1) =$		0.40%
$IP = r_{\text{T-bond}} - r^* - MRP$		0.75%

11. You have 2 options to buy a membership. One is to pay \$5,000 upfront today and the other one is to pay \$500 each year starting **today**. If the prevailing discount rate is 8%, how many years do you remain as a member before the \$500 annual payment becomes more expensive than the one-time membership?
- 14.5 years
  - 17.5 years
  - 18.5 years
  - 19.5 years
  - 21.5 years

**Answer: b**

Set it BGN, then  $I=8$ ,  $PV=-5000$ ,  $PMT=500 \Rightarrow N=17.54$ , 18 after rounding. Alternatively, you can take a difference between the two payment (\$4,500), then  $I=8\%$ ,  $PV=-4500$ ,  $PMT=500 \Rightarrow N=16.54$ . Since your membership last for one more year after the current membership fee is paid, your membership ends in 17.54 years.

12. What is the bond contract feature that allows the issuer to redeem bonds under specified terms prior to maturity and when issuers more likely to redeem the outstanding bonds issue?
- Deferred call, when interest rates are higher than when the bonds are issued
  - Sinking fund provision, when interest rates are higher than when the bonds are issued
  - Indenture, whenever the buyer wants the issuer to redeem the outstanding bonds