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Instituto Superior de Economia e Gestão
UNIVERSIDADE TÉCNICA DE LISBOA

Gestão Financeira II / Corporate Finance II

Undergraduate Programs

Mid-Term Test

November 8th, 2010

Name: _____ No. _____

The test has 10 questions (9 of which multiple choice). Each correct answer scores 2 marks. Incorrect answers penalize 0.2 marks.

1) Consider the following two quotes for XYZ stock:

| **October 13th** | | **October 20th** | |
|---|---|---|---|
| Ask: | 24.25 | Ask: | 26.00 |
| Bid: | 23.70 | Bid: | 25.93 |

How much would you have to pay to purchase 100 shares of XYZ stock on October 20th?
A) $2425
B) $2570
C) $2593
**D) $2600**

**Why? Because we buy at the Ask price, spending: 100*$26.00= $2600.**

2) Your great aunt Matilda put some money in an account for you on the day you were born. This account pays 8% interest per year. On your 21st birthday the account balance was $5,033.83. The amount of money that your great aunt Matilda originally put in the account is closest to:

A) $600
B) $800
**C) $1,000**
D) $1,200
**Why? Because $1000 is the present value of $5,033.83 in 21 years' time, compounded at 8% per year:**

$$\frac{5033.83}{(1.08)^{21}} = \$1000$$

3) Consider the following investment alternatives:

| Investment | Rate | Compounding |
|---|---|---|
| A | 6.25% | Annual |
| B | 6.10% | Daily |
| C | 6.125 | Quarterly |
| D | 6.120 | Monthly |

Which alternative offers you the highest effective rate of return?

A) Investment A

B) Investment B

C) Investment C

**D) Investment D**

**Why? Based on the APRs with different frequency of payment we compute the EARs and choose the highest:**

| Data | Rate | Compounding | Number of Payments, n | EAR |
|---|---|---|---|---|
| A | 6,25% | Annual | 1 | 0,0625 |
| B | 6,10% | Daily | 365 | 0,062893 |
| C | 6,13% | Quarterly | 4 | 0,062671 |
| D | 6,12% | Monthly | 12 | 0,062946 |

**Where:** $EAR = \left[1 + \frac{APR}{n}\right]^{n} - 1$

4) Boulderado has come up with a new composite snowboard. Development will take Boulderado four years and cost $250,000 per year, with the first of the four equal investments payable today upon acceptance of the project. Once in production the snowboard is expected to produce annual cash flows of $200,000 each year for 10 years. Boulderado's discount rate is 10%.
The NPV for Boulderado's snowboard project is closest to:

A) $228,900

B) $46,900

**C) $51,600**

D) $23,800

**Why? Consider the cash flows:**

| t | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF | -250 | -250 | -250 | -250 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

**And the NPV at rate 10%:**

$$NPV_0 = -250{,}000 + 250{,}000 * \left[\frac{1}{0.1}\left(1 - \frac{1}{1.1^{3}}\right)\right] + \frac{200{,}000 * \left[\frac{1}{0.1}\left(1 - \frac{1}{1.1^{10}}\right)\right]}{1.1^{3}} = \$51{,}600$$

5) Larry the Cucumber has been offered $14 million upfront to star in the lead role of the next three Larry Boy adventure movies. If Larry takes this offer, he will have to forgo acting in other Veggie movies that would pay him $5 million at the end of each of the next three years. Assume Larry's personal cost of capital is 10% per year.
Larry should:

A) reject the offer because the NPV < 0.

**B) accept the offer even though the IRR < 10%, because the NPV > 0.**

C) reject the offer because the IRR < 10%.

D) accept the offer because the IRR > 0%.

**Why? Look at the cash flows:**

| t | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| CF | 14000000 | -5000000 | -5000000 | -5000000 |

**Computing the IRR is not very helpful because the interpretation is not the usual one, since the initial cashflows are positive and later negative. We can immediately eliminate option C. Option D also doesn't make sense.**
**We may compute the NPV at the 10% cost of capital, reaching:**

$$NPV_0 = 14{,}000{,}000 - 5{,}000{,}000 * \left[ \frac{1}{0.1}\left(1 - \frac{1}{1.1^3}\right)\right] = \$1{,}565{,}740 > 0.$$

**Because the NPV is positive we eliminate answer A, so it must be the case that option B is the right one (you may also check that indeed irr=3.53%<10%).**

6) Consider the following two projects:

| Project | Year 0 C/F | Year 1 C/F | Year 2 C/F | Year 3 C/F | Year 4 C/F | Year 5 C/F | Year 6 C/F | Year 7 C/F | Discount Rate |
|---|---|---|---|---|---|---|---|---|---|
| Alpha | -79 | 20 | 25 | 30 | 35 | 40 | N/A | N/A | 15% |
| Beta | -80 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 16% |

Assume that projects Alpha and Beta are mutually exclusive. Which of the following statements is true regarding the investment decision tools' suitability for deciding between projects Alpha & Beta?

A) The incremental IRR should not be used since the projects have different lives.

**B) The incremental IRR should not be used since the projects have different discount rates.**

C) The incremental IRR should not be used since the projects have different cash flow patterns.

D) Both the NPV and incremental IRR approaches are appropriate to solve this problem.

**Why? If the projects have different discount rates you can't really interpret an incremental IRR. You would have to base the comparison exclusively on the NPV rule.**

7) Kinston Industries is considering investing in a machine that will cost $125,000 and will last for three years. The machine will generate revenues of $120,000 each year and the cost of goods sold will be 50% of sales. At the end of year three the machine will be sold for $15,000. Annual net working capital is 10% of next year's revenues. The appropriate cost of capital is 10% and Kinston is in the 35% tax bracket. Assume that Kinston's new machine will be depreciated straight line to a salvage value of $5,000 at the end of year three.

7.1) What is the NPV of the project? Should Kinston Industries invest in the machine? Why?

**You must start by estimating the annual FCF and then compute the NPV.**

| | t | 0 | 1 | 2 | 3 | |
|---|---|---|---|---|---|---|
| 1 | Revenues | 0 | 120000 | 120000 | 120000 | initial data |
| 2 | COGS | 0 | 60000 | 60000 | 60000 | 50% of row 1 |
| 3 | Depreciation | 0 | 40000 | 40000 | 40000 | 1/3(125000-5000) |
| 4 | EBIT | 0 | 20000 | 20000 | 20000 | 1-2-3 |
| 5 | Income Tax | 0 | 7000 | 7000 | 7000 | 35%*EBIT |
| 6 | Unlevered NI | 0 | 13000 | 13000 | 13000 | 4-5 |
| 7 | Depreciation | 0 | 40000 | 40000 | 40000 | row 3 |
| 8 | CapEx | 125000 | 0 | 0 | 0 | initial data |
| 9 | Liquidation | 0 | 0 | 0 | 11500 | 15000-0.35(15000-5000) |
| 10 | NWC | 12000 | 12000 | 12000 | 0 | 10% of next year's row 1 |
| 11 | Increase in NWC | 12000 | 0 | 0 | -12000 | change in row 10 from last year |
| 12 | FCF | -137000 | 53000 | 53000 | 76500 | 6+7-8+9-11 |

$$NPV_0 = -137{,}000 + \frac{53{,}000}{1+0.1} + \frac{53{,}000}{1.1^2} + \frac{76{,}500}{1.1^3} = \$12{,}459.$$

Because NPV>0 Kinston Industries should invest in the machine.

7.2) Consider the following statement: "The IRR of the project does not exceed 12%". Without computing the IRR, explain why you agree/disagree with the statement.

Because the NPV>0 with a discount rate of 10%, we already know that IRR>10% (given that the cash flows are "well behaved").
But the question asks us about IRR being or not larger than 12%. We can check this by computing the NPV with rate 12%:

$$NPV_0 \text{ with rate } 12\% = -137{,}000 + \frac{53{,}000}{1+0.12} + \frac{53{,}000}{1.12^2} + \frac{76{,}500}{1.12^3} = \$7{,}023.89.$$

With a 12% discount rate the NPV would still be positive. This means that the project's IRR is higher than 12%.
Therefore I disagree with the statement.

8) The following table summarizes prices of various default-free zero-coupon bonds (expressed as a percentage of face value):

| **Maturity (years)** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| Price (per $100face value) | 94.52 | 89.68 | 85.40 | 81.65 | 78.35 |

The yield to maturity for the three year zero-coupon bond is closest to:
**A) 5.4%**
B) 5.8%
C) 5.6%
D) 6.0%

**Why? Because the price of the 3-year zero-coupon bond must equal the present value of its face value in 3 years' time, discounted at the YTM. So:**

$$85.40 = \frac{100}{(1+YTM_3)^3}$$

$$YTM_3 = \left(\frac{100}{85.40}\right)^{\frac{1}{3}} - 1 = 0.054016$$

9) Luther Industries needs to raise $25 million to fund a new office complex. The company plans on issuing ten-year bonds with a face value of $1000 and a coupon rate of 7.0% (annual payments). The following table summarizes the YTM for similar ten-year corporate bonds of various credit ratings:

| **Rating** | **AAA** | **AA** | **A** | **BBB** | **BB** |
|---|---|---|---|---|---|
| YTM | 6.70% | 6.80% | 7.00% | 7.40% | 8.00% |

Suppose that when these bonds were issued, Luther received a price of $972.42 for each bond. What is the likely rating that Luther's bonds received?
A) AA
**B) BBB**
C) B
D) A

**Why? The bonds were issued at a discount. This means that the YTM of the bonds is higher than the coupon rate (7%). Therefore we immediately eliminate ratings AAA, AA and A.**
**Ratings BBB, BB (in the table) or lower (even if not showed in the table) are possible correct answers. Because BB isn't among the possible answers, we need to check if BBB is the correct answer. If not, perhaps the truth is that the rating is B.**
**Check if rating BBB with a YTM of 7.40% gives the correct price:**

$$(0.07*1000)*\left[\frac{1}{0.074}\left(1-\frac{1}{1.074^{10}}\right)\right]+\frac{1000}{1.074^4} = 972.42$$

**It does.**

10) Which of the following statements is false?

A) The holder of a callable bond faces reinvestment risk precisely when it hurts: when market rates are lower than the coupon rate she is currently receiving.
B) When yields have risen, the issuer will not choose to exercise the call on the callable bond.
**C) The issuer will exercise the call option only when the prevailing market rate exceeds the coupon rate of the bond.**
D) A callable bond is relatively less attractive to the bondholder than the identical non-callable bond.