

Past EXAM (two-hour exam)

Title: Corporate Finance

Note that is the exam in the last year, some questions (struck through) are not relevant for this year.

SECTION A (30%)

Section A consists of 15 Multiple Choice Questions. Each question carries 2 marks.

1. You have just taken out a 10-year loan from a bank to buy a car that costs 10,000\$ with the annual interest rate of 3%. What is your monthly payment of the loan each of the next ten years?
 - A. 96.56\$
 - B. 97.69\$
 - C. 72.58\$
 - D. 1172.31\$

Answer: A $=10000 \times 0.03/12/(1-1/(1+0.03/12)^{120})$

2. You are saving a down payment for a house. You have now already saved 10,000 and plan to save 1,000 per year at the end of each year. If you earn 5% per year on your savings, how long will it take to have 100,000. Which is the excel formula to solve the above problem?
 - A. NPER(0.05, -1000, -10000,100000)
 - B. NPER(0.05,1000, -10000,100000)
 - C. NPER(0.05,1000,10000,100000)
 - D. None of the above

Answer: A

3. Suppose you already saved 100,000 in the bank account at the beginning and decide to withdraw \$5,000 each year. The rate is 6% per year. How much do you have left in the bank account after 10 years. Which is the excel formula to solve the above problem?
 - A. FV(0.06,10,5000,100000)
 - B. FV(0.06,10,5000,-100000)
 - C. -PV(0.06,10,5000,100000)
 - D. -PV(0.06,10, -5000,100000)

Answer: B

- ~~4. You are considering purchasing a plant that costs \$50,000 and generate cash flows of \$12,000 per year. The plant will depreciate evenly over the five years with no residual value. The cost of capital is 5% per year. What is economic value added (EVA) at the end of year 2?~~
 - ~~A. -500~~
 - ~~B. 0~~
 - ~~C. 500~~
 - ~~D. 1953.72~~

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~~Answer: B~~

5. How much are you effectively earning with an APR (annual percentage rate) of 20% with quarterly compounding?

- A. 25%
- B. 21.55%
- C. 5%
- D. 21%

Answer: B

~~6. A bond has the below characteristics as of Dec 31, 2023. The price of the bond per 1,000 face value is closest to:~~

Coupon rate	8%
Coupon frequency	Annual
Yield to maturity	6%
Maturity date	Dec 31, 2029

- ~~A. 1099.54~~
- ~~B. 907.54~~
- ~~C. 1122.33~~
- ~~D. 1098.35~~

~~Answer: D~~

Assume the following information and the costs/revenues all occur in the same year, answer questions 7 and 8.

ABC Inc. invested \$30m of property, plant and equipment. This year the investment project starts to generate sales. It produces sales revenues of \$135m (with no costs of goods sold) and net income of \$40m, and operating cash flows of \$54m, pay dividends of \$12m, have accounts receivables equivalent to 15% of sales, no inventory and the after-tax interest cost is \$5m during the year.

7. What is the implied depreciation expense for ABC Inc.?

- A. 34.25 m
- B. 29 m
- C. 59 m
- D. None of the above

Answer: A $54 + 15\% \times 135 - 40$

8. What is the free cash flow for ABC Inc.?

- A. 34.25 m

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- B. 29 m
- C. 59 m
- D. None of the above

Answer: B $54+5-30=29$

9. Which of the following option positions is most likely to be in a disadvantage position when stock prices go down?

- A. Short a call
- B. Long a put
- C. Long a call
- D. Short a stock

Answer: C Only longing a call is a bullish position

10. Alex Inc. is contemplating building a retail store across town. The company already owned a warehouse for the retail store which the company acquired three years ago for \$3 million. Which of the following is most likely to be considered as irrelevant costs?

- A. The value of warehouse if it's sold.
- B. The loss of sales in the existing product line due to the opening of retail outlet.
- C. The \$3 million acquisition costs of the warehouse.
- D. The electricity costs for the retail store.

Answer: C

11. Cran Co. has dividends of \$5 per share in the upcoming. The current share price is 40\$. What is the closet new share price if the return on equity is expected to be 10%?

- A. 40
- B. 39
- C. 41
- D. None of the above.

Answer: B $40 \times (1+10\%) - 5$ $P_0 = (D_1+P_1) / (1+r)$ where $P_0=40$, $D_1=5$ and $r=10\%$

12. Incremental IRR: Consider the following two mutually exclusive projects

	Project A	Project B
Year 0	-25000	-23500
Year 1	800	3000
Year 2	1600	2000

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Year 3	5500	500
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What is the Excel formula for the calculating the incremental IRR/cross-over rate that equates the value Project A to the value of Project B.

- A. IRR(-25000,800,1600,5500)
- B. IRR(-25000,800,1600,5500) - IRR(-23500,3000,2000,500)
- C. IRR(-1500,2200,400, -5000)
- D. IRR(1500,2200,400, -5000)

Answer: D

13. ~~Nelta Corp. has a total of 800\$ available to spend and has to choose from the following projects:~~

Project	NPV	Initial investment
A	120\$	50\$
B	550\$	350\$
C	1200\$	600\$
D	70\$	60\$

~~What projects would Nelta Corp. choose:~~

- ~~A. All of them~~
- ~~B. Project A and C~~
- ~~C. Project A and B and C~~
- ~~D. Project A and C and D~~

Answer: D

14. Which of the following is incorrect about stock liquidity?

- A. It can be measured by bid-ask spread.
- B. It indicates that investors can buy or sell large volume without too much market movement.
- C. You can sell a stock at the price closest to where you bought it.
- D. A liquid stock leads to great arbitrage potential due to its large bid-ask spread.

Answer: D A liquid stock has limited arbitrage opportunities.

15. ~~A bond being classified as Baa by Moody's is considered as?~~

- ~~A. Investment grade bond~~
- ~~B. Speculative bond~~
- ~~C. Junk bond~~
- ~~D. High yield bond~~

Answer: A

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SECTION B (70%)

Section B consists of 6 Questions. Show the steps or formula you use to solve problems.

Q1. Consider the following project:

Year	Cash flow
0	-25,000
1	12,500
2	18,700
3	11,800

- What is the NPV of this project if the discount rate is 10%? What is the Excel function that is used to compute the NPV of the project, please also identify the numbers placed inside the Excel function? (4 marks)
- Use the method of Trial and Error to estimate the IRR of this project. Start with a guess of discount rate between 31% and 34%. (5 marks)
- What are the disadvantages of IRR compared to NPV? Name at least two of them. (2 marks)
- What is the payback period of the project? (2 marks)

Answer:

- 10683.7
- 32.98%
- Can't use IRR to compare mutually exclusive projects due to timing differences or scaling problems; There can be multiple IRRs or no IRR for non-conventional cash flows
- 1.67 years

Q2. A company borrow \$60,000 3-year loan at 8% from a bank. What is the amortization schedule for a Fixed Payment Schedule? Show your interest payment and principal payment for each of the year. (10 marks)

Beginning balance	Periodic Payment	Interest	Principal Payment	Ending balance
60000	23,282.01	4800	18,482.01	41,517.99
41,517.99	23,282.01	3321.44	19,960.57	21,557.42
21,557.42	23,282.01	1724.6	21,557.42	0.00

Q3. Stock returns.

Assume the following information for Delta Airline.

Quarters	Dividends	Price
2010Q4	0.13	28
2011Q1	0.00	28
2011Q2	0.10	30
2011Q3	0.12	31
2011Q4	0.16	31

- What are realized returns from 2011Q1 to 2011Q4? (4 marks)

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- b) What is the annualized return for the year of 2011? (3 marks)
- ~~e) What is the average return? (2 marks)~~

Answer:

- a) 0 0.075 0.0373 0.005
- b) $(1+0\%) \times (1+0.075) \times (1+0.0373) \times (1+0.005) - 1 = 12.1\%$
- ~~e) $(0+0.075+0.0373+0.005)/4=0.029$~~

Q4. Capital budgeting analysis.

You are considering an investment project with an estimated life of 2 years with following information (unit: millions):

Revenue Estimates Sales = 100 units/year Per Unit Price = \$120

Cost Estimates Per Unit = \$50

There are no overhead expenses but it incurs R&D expenses of 100\$ each year over the life of *the project*.

Accounts Receivables is equal to 10% of sales and Accounts Payables is equal to 5% of costs of goods sold. There is no inventory.

Up-Front New Equipment = \$15,000; The Expected life of the new equipment is 3 years and straight-line depreciation method is used.

The required rate of return is 5% and the corporate tax rate is 30%.

Present the capital budgeting decision in a Table including the following information:

- a) What are the earnings before tax and interest (EBIT) for year 1 and year 2? (4 marks)
- b) What is the unlevered net income for year 1, 2, and 3? (3 marks)
- c) What are the free cash flows for year 0, 1, 2, and 3? (6 marks)
- d) What is the NPV of the project? (2 marks)
- e) Would you expect NPV to increase or decrease if you adopt a 3-year MACRS depreciation scheme? (1 mark)

Answer:

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	Year 0	Year 1	Year 2	
Sales		12000	12000	
COGS		5000	5000	
Gross profit		7000	7000	
RD		100	100	
Depreciation		5000	5000	5000
EBIT		1900	1900	-5000
Tax		570	570	-1500
Unlevered N	0	1330	1330	-3500
Capex	15000			
Depreciation		5000	5000	5000
Change in NWC		950	0	-950
FCF	-15000	5380	6330	2450

$$NPV = -15000 + 5380/1.05 + 6330/1.05^2 + 2450/1.05^3 = -2018.29$$

Q5. Cost of capital.

Suppose your company has an equity beta of 0.5 and the current risk-free rate is 2.1%. If the expected market return is 8.6%, and the interest cost is 1%. The company is financed with 60% of debt and 40% of equity. If the tax rate is 30%, answer the following questions.

- What is the cost of equity? (3 marks)
- ~~What is the weighted average cost of capital? (3 marks)~~
- What is the risk premium of the company? (1 mark)
- What data would you use to evaluate market return if the company is based in Germany? (1 mark) What data would you use to proxy risk-free rate if the company is based in the US? (1 mark)
- How do you estimate beta with data available for returns of company and market return? You can start with “run a regression of ...”. (1 mark)
- Assume the risk-free rate is a good proxy for nominal interest rate, what is the real rate of return if the inflation rate is 1%. (2 marks)

Answer:

- The cost of equity is $0.5 \times (8.6\% - 2.1\%) + 2.1\% = 5.35\%$
- ~~WACC is $5.35\% \times 0.4 + 1\% \times (1 - 30\%) \times 0.6 = 2.56\%$~~
- Risk premium $5.35\% - 2.1\% = 3.25\%$
- Return on DAX 40 market index; US Treasury bill rate
- Run a regression of company return on market return
- Real rate of return: $(1 + 2.1\%) / (1 + 1\%) - 1 = 1.089\%$

Q6. Discussions.

- ~~What does PEAD stand for? Which form of efficient market can PEAD be used to test against? (2 marks)~~
- ~~Explain what a premium bond is. (1 mark).~~
- What are the benefits of paying high dividends? (4 marks)

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- d) What is the definition of agency conflicts? What are the potential solutions for agency issues, name at least two of them? (3 marks)

Short Answer:

- a) ~~Post earnings announcement drift; Semi-strong form market efficiency~~
b) ~~A bond that is issued above par (higher than the face value) or has coupon rate higher than the yield.~~
c) It favors low-tax payers, individuals that desire current income and have high uncertainty-avoidance. For companies, it helps reduce excess cash, managers can signal that they have positive information, and attract investor who want current income.
d) Conflicts between agents (managers) and principle (shareholders). Tie managers' compensation to stock value, Direct inventions (shareholders' proposal or votes), Rely on hostile takeover (raiders take control of companies with poor management).

Formula Sheet of Excel:

Payment per period: PMT (rate,nper,pv,[fv],[type])

Present value: PV (rate, nper, pmt,[fv],[type])

Future value: FV (rate, nper, [pmt], [pv], [type])

Number of payment: NPER (rate, pmt, pv, [fv], [type])

Net Present Value: NPV (rate, value1, value 2,...)

Internal rate of return: IRR(value 1, value 2,..)