



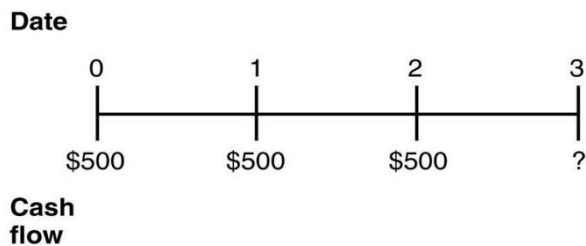
EXAM

Course code:	BE 210
Course name:	Finansiering og investering
Date:	9 May, 2019
Duration:	09.00 – 13.00
Pages:	9 pages in total, including a 3 page attachment with useful formulas.
Allowed aid:	Calculators with empty memory, dictionary
Note:	You can answer in English or Norwegian

Exercise 1 (40%)

20 questions in total. Correct answer is 1 point, wrong answer is 0 point. Also 0 points if you pick more than one answer. If you do not like any of the alternatives, give a brief explanation why this is so. Make a two-column table with the question number in the left column, and the answer in the right. You can present calculations/comments below the table if this is preferred (but not necessary).

1) Consider the timeline of the following cash flow:



If the current market rate of interest is 7%, then the future value of this cash flow as of year 3 is closest to:

- A) \$1720
- B) \$1500
- C) \$1404
- D) \$1717

2) Since your first birthday, your grandparents have been depositing \$1000 into a savings account on every one of your birthdays. The account pays 4% interest annually. Immediately after your grandparents make the deposit on your 18th birthday, the amount of money in your savings account will be closest to:

- A) \$25,645
- B) \$36,465
- C) \$12,659
- D) \$18,000

3) The Sisyphean Company has a bond outstanding with a face value of \$1000 that reaches maturity in 15 years. The stated coupon rate for this bond is 5% and the coupon payments are to be made annually.

Assuming the appropriate YTM on the Sisyphean bond is 3%, then this bond will trade at

- A) par.
- B) a discount.
- C) a premium.
- D) None of the above

4) Which of the following statements is FALSE?

- A) Because the cash flows promised by the bond are the most that bondholders can hope to receive, the cash flows that a purchaser of a bond with credit risk expects to receive may be less than that amount.
- B) By consulting bond ratings, investors can assess the credit-worthiness of a particular bond issue.
- C) Because the yield to maturity for a bond is calculated using the promised cash flows, the yield of bonds with credit risk will be lower than that of otherwise identical default-free bonds.
- D) A higher yield to maturity does not necessarily imply that a bond's expected return is higher.



5) Which of the following statements is FALSE?

- A) The IRR investment rule states you should turn down any investment opportunity where the IRR is less than the opportunity cost of capital.
- B) The IRR investment rule states that you should take any investment opportunity where the IRR exceeds the opportunity cost of capital.
- C) Since the IRR rule is based upon the rate at which the NPV equals zero, like the NPV decision rule, the IRR decision rule will always identify the correct investment decisions.
- D) There are situations in which multiple IRRs exist.

Consider the projected cash flow for project A:

	Year 0	Year 1	Year 2	Year 3	Discount
Project	Cash Flow	Cash Flow	Cash Flow	Cash Flow	Rate
A	-100	40	50	60	15%

6) Assuming capital is a scarce resource, the profitability index for project A is closest to:

- A) 0.12
- B) 21.65
- C) 0.17
- D) 12.04

7) Which of the following cash flows are relevant incremental free cash flows for a project that you are currently considering investing in?

- A) The tax savings brought about by the project's depreciation expense
- B) The cost of a marketing survey you conducted to determine demand for the proposed project
- C) Interest payments on debt used to finance the project
- D) Research and Development expenditures you have made

8) You expect KT Industries (KTI) will have earnings per share of \$3 this coming year and expect that they will pay out \$1.50 of these earnings to shareholders in the form of a dividend. You expect that the payout rate will remain constant in the future. KTI's return on new investments is 15% and their equity cost of capital is 12%. The value of a share of KTI's stock is closest to:

- A) \$39.25
- B) \$20.00
- C) \$33.35
- D) \$12.50

9) MJ Ltd. is expected to grow at various rates over the next five years. The company just paid a \$1.00 dividend. The company expects to grow at 20% for the next two years (affecting D_1 and D_2), then the company expects to grow at 10% for three additional years (affecting D_3 , D_4 , D_5) after which the company expects to grow at a constant rate of 5% per year indefinitely. If the required rate of return on MJ's common stock is 12%, then the value of a share of MJ's stock according to the dividend discount model is closest to:

- A) \$21.85
- B) \$28.50
- C) \$12.15
- D) \$18.25

10) Which of the following statements is FALSE?

- A) We must discount the dividends using the equity cost of capital for the stock.
- B) The dividend yield is the percentage return the investor expects to earn from the dividend paid by the stock.
- C) The firm might pay out cash to its shareholders in the form of a dividend.
- D) The dividend yield is the expected annual dividend of a stock, divided by its expected future sale price.

Use the information for the questions 11 and 12 below:

You expect CCM Corporation to generate the following free cash flows over the next five years:

Year	1	2	3	4	5
FCF (\$ millions)	25	28	32	37	40

Following year five, you estimate that CCM's free cash flows will grow at 5% per year and that CCM's weighted average cost of capital is 13%.

11) The enterprise value of CCM corporation is closest to:

- A) \$396 million
- B) \$290 million
- C) \$382 million
- D) \$350 million

12) If CCM has \$200 million of debt, zero cash, and 8 million shares of stock outstanding, then the share price for CCM is closest to:

- A) \$49.50
- B) \$12.50
- C) \$19.35
- D) \$24.50

13) You expect Whirlpool Corporation to have earnings per share of \$6.10 over the coming year. If the average P/E ratio for the appliance industry sector is 17.0, the value of a share of Whirlpool stock based upon the comparables approach is closest to:

- A) \$103.70
- B) \$27.90
- C) \$35.90
- D) \$23.10

Consider the following probability distribution of returns for Alpha Corporation:

Current Stock Price (\$)	Stock Price in One Year (\$)	Return R	Probability PR
	\$35	40%	25%
\$25	\$25	0%	50%
	\$20	-20%	25%

14) The variance of the return on Alpha Corporation is closest to:

- A) 0.05
- B) 0.0475
- C) 0.03625
- D) 0.0375

15) Common risk is also called:

- A) diversifiable risk.
- B) Undiversifiable risk.
- C) uncorrelated risk.
- D) independent risk.

Use the following information to answer the questions 16 and 17 below:

	Beta	Volatility
"Eenie"	0.45	20%
"Meenie"	0.75	18%
"Miney"	1.05	35%
"Moe"	1.20	25%



16) Which firm has the most total risk?

- A) Eenie
- B) Meenie
- C) Miney
- D) Moe

17) Which firm has the least market risk?

- A) Eenie
- B) Meenie
- C) Miney
- D) Moe

Use the following information to answer the questions 18 and 19 below:

Rating	AAA	AA	A	BBB	BB	B	CCC
Debt beta	0.05	0.05	0.05	0.10	0.17	0.26	0.31

18) Wyatt Oil has a bond issue outstanding with seven years to maturity, a yield to maturity of 5.5%, and a BBB rating. The corresponding risk-free rate is 3% and the market risk premium is 5%. The expected return on Wyatt Oil's debt is closest to:

- A) 3.0%
- B) 3.5%
- C) 4.9%
- D) 5.5%

19) Trucks R' Us has a market capitalization of \$142 billion, \$78 billion in BB rated debt, and \$10 billion in cash. If Trucks R' Us' equity beta is 1.68, then their underlying asset beta is closest to:

- A) 1.00
- B) 1.20
- C) 1.32
- D) 1.48

20) Which of the following is true of asset betas?

- A) Asset betas are expected to vary greatly within firms in the same industry.
- B) Businesses that are less sensitive to market and economic conditions tend to have higher asset betas than more cyclical industries.
- C) Businesses that are less sensitive to market and economic conditions tend to have lower asset betas than more cyclical industries.
- D) A and B are correct.

Exercise 2 (15%)

On your 40th birthday you decide to start saving for retirement. You will save a fixed amount each month, starting one month from now. Suppose that your savings account pays interest of 6% APR with monthly compounding for the rest of your lifetime. You want to retire twenty years from now, at the age of 60.

- a) If you save \$500 each month, how much money is in your savings account on your 60th birthday just after your monthly deposit?
- b) After you retire you make equal monthly withdrawals from your savings account. Assuming your savings will last until your 90th birthday, what monthly amount can you withdraw from the savings account (first withdrawal one month into retirement)?
- c) You decide to increase your monthly savings to be able to live more comfortably in your retirement. What fixed monthly amount must you save over the next 20 years to be able to withdraw \$5000 per month over the subsequent 30 years?



Exercise 3 (25%)

Brew Dog Breweries Inc (BDB) is considering investing in a new production unit to launch a new brand of beer – “The bearded lady”. The investment cost is \$400,000, which will be depreciated over five years using straight-line depreciation. At the end of 5 years the project will be terminated and the production unit is expected to be sold for \$20,000. Sales prognosis for the “The bearded lady” is given in the table below:

Expected number of bottles sold	Year				
	1	2	3	4	5
	50 000	80 000	150 000	100 000	80 000

The sales price is estimated at \$2 per bottle. Costs of sales and variable operating expenses are estimated to be 30% of sales in total. Other estimated costs incremental to this project are \$20,000 per year. The project requires an initial investment into working capital equal to 10% of predicted first year sales. Subsequently, net working capital is 10% of predicted sales over the following year. Thus, working capital is fully recovered after the project ends. The company faces a 30% corporate tax rate.

- a) What are the free cash flows of the project? If the cost of capital is 15%, what is the NPV of this project? What is the IRR of the project? Should the project be accepted according to NPV and/or IRR?
- b) Answer briefly:
 - 1) What is a sunk cost? Should it be included when calculating the free cash flow for a project? Why or why not?
 - 2) What is an opportunity cost? Should it be included when calculating the free cash flow for a project? Why or why not?
 - 3) What is referred to as cannibalization when a company launches a new product. Should the effect of cannibalization be included when calculating the free cash flow for a project? Why or why not?

Exercise 4 (20%)

Rockebakker Systems (RS) has 45 million shares outstanding trading for \$10 per share. In addition, RS has \$300 million in outstanding debt and no cash. Suppose RS's equity cost of capital is 12%, its debt cost of capital is 7%, and the corporate tax rate is 35%.

- a) What is RS's unlevered cost of capital?
- b) What is RS's after-tax debt cost of capital? What is RS's weighted average cost of capital?
- c) RS is expected to pay dividends of \$1 per share one year from now. Using the simple dividend model with constant growth, what is the implied growth rate of dividends consistent with today's price of \$10 per share?

You consider investing in a project. For this project, you consider RS a comparable firm with equal business risk. You expect the project to generate a perpetual free cash flow of \$1 million in one year with 2% constant growth rate.

- d) What is the value of the project if it is financed only with equity?
- e) What is the value of the project if it is financed with the same proportion of debt and equity (capital structure) as RS? Compare to the value in part c) and explain the difference in project value.

BE-210 Formula sheet

Financial Statement Analysis

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$$

$$\text{Enterprise Value} = \text{Market Value of Equity} + \text{Debt} - \text{Cash}$$

Financial Decision Making and the Law of One Price

$$\text{NPV} = \text{PV}(\text{Benefits}) - \text{PV}(\text{Cost})$$

$$\text{Price of a Security} = \text{PV}(\text{All cash flows paid by the security})$$

Time Value of Money

$$PV(C_n) = \frac{C_n}{(1+r)^n} \quad FV_n(C) = C \times (1+r)^n$$

$$PV(\text{Stream of Cash Flow}) = \sum_{n=0}^N \frac{C_n}{(1+r)^n}$$

$$PV(\text{perpetuity}) = \frac{C}{r} \quad PV(\text{growing perpetuity}) = \frac{C}{r-g}$$

$$PV(\text{annuity}) = C \times \frac{1}{r} \left(1 - \frac{1}{(1+r)^N} \right) \quad FV(\text{annuity}) = C \times \frac{1}{r} ((1+r)^N - 1)$$

$$PV(\text{growing annuity}) = C \times \frac{1}{r-g} \left(1 - \left(\frac{1+g}{1+r} \right)^N \right)$$

$$\text{Periodic payment, } C, \text{ for } N\text{-period loan with principal } P: \quad C = \frac{P}{\frac{1}{r} \left(1 - \frac{1}{(1+r)^N} \right)}$$

$$IRR \text{ with two cash flows} = \left(\frac{FV}{P} \right)^{\frac{1}{N}} - 1 \quad IRR \text{ of growing perpetuity} = \frac{C}{P} + g$$

Interest Rates

$$1 + EAR = \left(1 + \frac{APR}{k} \right)^k$$

$$PV = \frac{C_1}{1+r_1} + \frac{C_2}{(1+r_2)^2} + \dots + \frac{C_N}{(1+r_N)^N} = \sum_{n=1}^N \frac{C_n}{(1+r_n)^n}$$

$$\text{After-tax interest rate} = r(1 - \tau_c) \quad r_r = \frac{r-i}{1+i} \approx r-i$$

Valuing Bonds

$$CPN = \frac{\text{Coupon Rate} \times \text{Face Value}}{\text{Number of Coupon Payments per Year}}$$

$$PV(\text{Bond Cash Flow}) = \frac{CPN}{1+y} + \frac{CPN}{(1+y)^2} + \dots + \frac{CPN + FV}{(1+y)^n}$$

$$PV = CPN \times \frac{1}{y} \left(1 - \frac{1}{(1+y)^N} \right) + \frac{FV}{(1+y)^N}$$

Yield to maturity for zero coupon bond that matures in n periods : $y = \left(\frac{FV}{P} \right)^{\frac{1}{n}} - 1$

Capital Budgeting

$$\text{Unlevered Net Income} = \text{EBIT} \times (1 - \tau_c) = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - \tau_c)$$

$$\text{Free Cash Flow} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - \tau_c) + \text{Depreciation} - \text{CapEx} - \Delta NWC$$

Investment Decision Rules

$$\text{Profitability Index} = \frac{\text{Value Created}}{\text{Resources Consumed}} = \frac{\text{NPV}}{\text{Resources Consumed}}$$

Valuing Stocks

$$r_E = \frac{Div_1 + P_1}{P_0} - 1 = \underbrace{\frac{Div_1}{P_0}}_{\text{Dividend yield}} + \underbrace{\frac{P_1 - P_0}{P_0}}_{\text{Capital Gain Rate}}$$

$$P_0 = \frac{Div_1}{1+r_E} + \frac{Div_2}{(1+r_E)^2} + \dots + \frac{Div_N}{(1+r_E)^N} + \frac{P_N}{(1+r_E)^N} \quad P_0 = \frac{Div_1}{r_E - g}$$

$$Div_t = \underbrace{\frac{\text{Earnings}_t}{\text{Shares Outstanding}_t}}_{EPS_t} \times \text{Dividend Payout Rate}_t$$

$$g = \text{Retention Rate} \times \text{Return on New Investment}$$

$$P_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0}$$

$$\text{Free Cash Flow} = EBIT \times (1 - \tau_c) - \text{Net Investment} - \text{Increases in Net Working Capital}$$

$$\text{Net Investment} = \text{Capital Expenditures} - \text{Depreciation}$$

$$V_0 = PV(\text{Future Free Cash Flow of Firm}) \quad P_0 = \frac{V_0 + \text{Cash}_0 - \text{Debt}_0}{\text{Shares Outstanding}_0}$$

Capital Markets and the Pricing of Risk

$$E[R] = \sum_R p_R \times R$$

$$Var(R) = E[(R - E[R])^2] = \sum_R p_R \times (R - E[R])^2 \quad SD(R) = \sqrt{Var(R)}$$

$$SD(\text{Average of Independent, Identical Risks}) = \frac{SD(\text{Individual Risk})}{\sqrt{\text{Number of Observations}}}$$

$$\text{Market Risk Premium} = E[R_{Mkt}] - r_f$$

$$r_i = r_f + \beta_i \times (E[R_{Mkt}] - r_f)$$

Estimating the Cost of Capital

$$r_d = \text{Yield to Maturity} - \text{Prob}(\text{default}) \times \text{Expected Loss Rate}$$

$$r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D \quad \beta_U = \frac{E}{E+D} \beta_E + \frac{D}{E+D} \beta_D$$

$$r_{wacc} = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D (1 - \tau_c) \quad r_{wacc} = r_U - \frac{D}{E+D} \tau_c r_D$$