School of Business and Economics

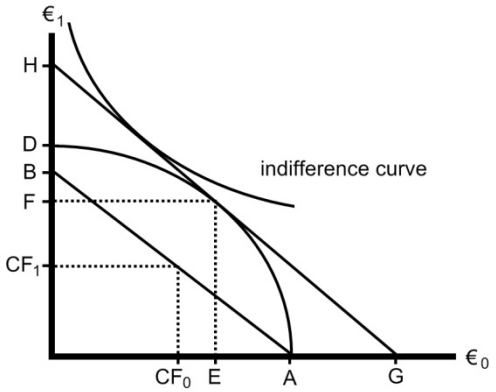
Exam:	Finance	Version A
Code:	E_IBA2_FIN	
Examinator:	Dr. M.B.J. Schauten	
Co-reader:	Prof. Dr. M.J. van den Assem	
Date:	19 December 2018	
Time:	15:15 – 17:15 hrs	
Duration:	2 hours	
Calculator allowed:	Yes	
Graphical calculator allowed:	No	
Number of questions:	19	
Type of questions:	16 multiple choice and 3 open	
Answer in:	English	
Remarks:	Answer the **multiple choice questions** by filling the corresponding box on the mc-answering form. For each question, only one answer is correct (a, b, c or d). If you give more than one answer, your response will be counted as wrong. The same is true if you provide no answer. The answers to the **open questions** should be written in the space below the open questions. There should be more than enough space for your answers. Numbers are in European (Dutch) format with decimal commas, and dots separating thousands (e.g. 1.234.567,89). **Write your name on both the mc-answering form and on this exam form. At the end of the exam you hand in the mc-answering form and the exam form with the supervisor**.	
Credit scores:	The maximum score for the mc questions is 72 points. To determine the score we take into account the expected number of correct answers when answers are given randomly. The maximum score for the open questions is 18 points. The final grade for this exam is: [total number of points + 10] / 10.	
Grades:	At the latest the grades will be made public on 16 January 2019.	
Inspection:	Will be announced via Canvas.	
Number of pages:	14 (including front page)	

Name : _____

Student number : _____

Part A: Multiple Choice questions (72 points)

1.
Assume a world according to the Hirshleifer model. The income of Christina at t = 0 and t = 1 (CF_0 and CF_1) is €100,00 and €51,00 respectively. The risk-free interest rate is 2,00%. At t = 0 Christina borrows €40,00 and invests €20,00 (EA). At t = 1 the consumption by Christina is €204,00 (C_1). Consider the figure below (not drawn to scale).

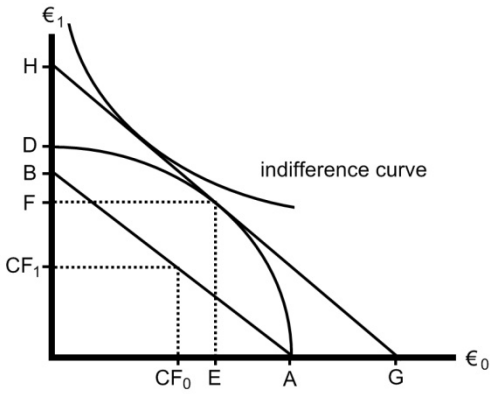


Question: At t = 1 the proceeds from the real investment projects (OF) are closest to

a. €193,80
b. €194,80
c. €195,80
d. €196,80

2.

Assume a world according to the Hirshleifer model. Winfried owns a shop in Groningen from which he earns €250,00 at t = 0 (CF_0) and €306,00 at t = 1 (CF_1). Winfried wants to expand and invests €500,00 in a new shop in Rotterdam at t = 0. The expected proceeds at t = 1 are €765,00. At t = 1 Winfried consumes €816,00 (C_1). The risk-free interest rate is 2,00%. Consider the figure below (not drawn to scale).



Question: The consumption by Winfried at t = 0 (C_0) is closest to

a. €0,00
b. €51,00
c. €100,00
d. €102,00

3.

The expected cash flows before tax of project Vulcanus are presented in the table below. The corporate tax rate equals 25%. Ignore other taxes. The investment outlay (at t = 0) for project Vulcanus is €60 and will be linearly depreciated in 2 years to zero. The required rate of return is 10%.

Table 1: Expected cash flows in euros before tax

CF_t	**Project Vulcanus**
CF_0	–60
CF_1	80
CF_2	120

Question: The net present value of the project is closest to

a. €80
b. €82
c. €84
d. €86

4.

The company Malaga is considering the implementation of a new project that now (t = 0) requires an investment in fixed assets of €7.000. The lifespan of the project is 3 years. The expected operational cash flows before corporate tax at the end of year 1, 2 and 3 are €4.500, €6.500 and €8.000, respectively. The investment of €7.000 is depreciated on a straight line basis based on historical cost in 3 years to €1.000. This means that the depreciation is €2.000 per year. It is assumed that the machine will be sold for €2.250 at t = 3. The corporate tax rate is 25%. The cost of capital is 6,00%. Ignore inflation.

Question: At t = 3 the total cash flow (including the proceeds from the divestment) after tax is closest to

a. €6.000
b. €6.500
c. €8.438
d. €8.750

5.

Niko van der Spar has the opportunity to invest in three projects. To start the projects, an investment outlay must be made at t = 0. The lifespan of each of the projects is one year. Each of the projects is expected to generate one cash flow only. The projects are mutually exclusive and can be implemented only once. The following is known about the three projects:

Project	**A**	**B**	**C**
Required rate of return	10%	12%	25%
Investment outlay at t = 0	€1.000	€1.000	€2.000
Expected cash flow at t = 1	€1.600	€1.800	€3.600

Entrepreneur Niko van der Spar aims to maximize shareholder value. Assume a perfect capital market. There is for instance no capital rationing.

Question: Which of the following statements is **false**?

a. The internal rate of return (IRR) of project A is higher than 10%.
b. The internal rate of return (IRR) of project B is 80%.
c. The net present value of project C is greater than the net present value of A.
d. Niko will invest in project B.

6.
Assume a perfect capital market. The nominal values of bonds A, B and C are all equal to €1.000. The bonds are bullets and free of default risk.

The following is known about bonds A, B and C:

Bond	Maturity	Coupon	Price
A	1 year	5,0%	€1.000,00
B	2 year	0,0%	€826,45
C	3 year	5,0%	€877,82

Question: Which of the following statements is **false**?

a. The yield to maturity of bond A is smaller than 10,0%.
b. The yield to maturity of bond B is greater than 5,0%.
c. The 1-year forward rate for the second year ($_1f_2$) is greater than 5,00%.
d. The 1-year forward rate for the third year ($_2f_3$) is greater than 10,00%.

7.
Assume a perfect capital market. Consider two bonds in this world. Bond A is a zero coupon bond and bond B has a coupon of 4%. The remaining maturity of both bonds is 10 years. Both bonds are bullets and free of default risk. The nominal value of each of the bonds is €1,000,00. The term structure of interest rates is increasing. The one-year spot rate is 1,00% (r_1 = 1,00%).

Question: Which of the following statements is **true**?

a. The duration of bond A is smaller than the duration of B.
b. The price of bond A is smaller than the price of B.
c. The yield to maturity of bond A is smaller than the yield to maturity of B.
d. The 1-year forward rate for the second year ($_1f_2$) is 1,00%.

8.
Assume a semi strong efficient capital market.

The following is known about the company Bigfarmo:
- the required return on current and future investments is 10,0%;
- at t = 1 the expected earnings per share is €1,00;
- the pay-out ratio is 100,0% and the annual growth rate of the earnings per share is 0,0%;
- at t = 0 the price per share is €10,00 (P_0 = €10,00);
- the return on new invested capital (RONI) is 12,0%;
- the enterprise is and remains fully equity financed;
- ignore inflation.

Question: If the payout ratio is permanently reduced from 100% to 60% starting at t = 1 and the retained earnings are invested anually in new projects with a RONI of 12,0%, then the price of the shares increases at the time of announcement (at t = 0) from €10,00 to

a. €11,13
b. €11,54
c. €11,93
d. €12,33

9.
During one of the lectures of week 3, the 'expectations theory' and 'liquidity preference theory' were discussed.

Question: Which of the following statements is **true**?

a. According to the expectations theory the expected 1-year spot rate at t = 1 is equal to the 1-year forward rate from t = 1 to t = 2 ($_1f_2$).
b. According to the expectations theory the expected 1-year spot rate at t = 1 is equal to the current 1-year spot rate (r_1).
c. According to the expectations theory the expected 1-year spot rate at t = 1 is equal to the 1-year forward rate from t = 1 to t = 2 ($_1f_2$) minus a liquidity premium.
d. According to the expectations theory the expected 1-year spot rate at t = 1 is equal to the 1-year forward rate from t = 1 to t = 2 ($_1f_2$) plus a liquidity premium.

10.

Assume a perfect capital market under certainty. For firm A and B, the following data is given:

	A	B
Earnings per share at t = 1 (EPS_1)	€10	€10
Dividend pay-out ratio (constant)	30%	40%
P_0	€100	€100

The return required by the shareholders of firm A and B is 10%. Assume that both the dividend payout ratio and the growth rate (g) of the two firms remain constant.

Question: Which of the following statements is **true**?

a. The growth rate of the dividend per share of firm A is 6%.
b. The growth rate of the dividend per share of firm A is 7%.
c. The growth rate of the dividend per share of firm B is 8%.
d. The growth rate of the dividend per share of firm B is 9%.

11.

Question: If the current inflation is 2,00%, the nominal interest rate that is required for a 7,00% real interest rate is equal to:

a. (1,07 × 1,02) - 1
b. (1,07 × 1,02)
c. (0,07 × 0,02) - 1
d. (0,07 + 0,02)

12.
Consider a world in which the assumptions of the portfolio theory hold.

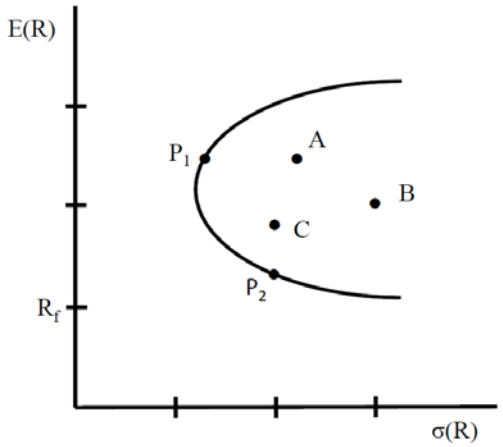
Regarding the securities A and B, the following probability distributions, with the probabilities for three possible states of the world and the corresponding returns, is given:

Probability	Return A	Return B
0,2	2%	8%
0,6	4%	6%
0,2	6%	4%

Question: Which of the following statements is **true**?

a. The covariance between the returns of A and B is negative.
b. The variance of the return of A is negative.
c. The risk of A (measured as the standard deviation of the return) is smaller than that of B.
d. The correlation coefficient between the returns of A and B is zero.

13.
Consider a world in which the assumptions of the CAPM hold. The curve through P_1 and P_2 in the figure below represents the minimum-risk frontier of the risk-bearing securities. Assume that $E(R_{P1}) = E(R_A)$ and $E(R_B) > E(R_C)$ and $\sigma(R_{P2}) = \sigma(R_C)$. it is possible to lend and borrow risk-free against the rate R_f.

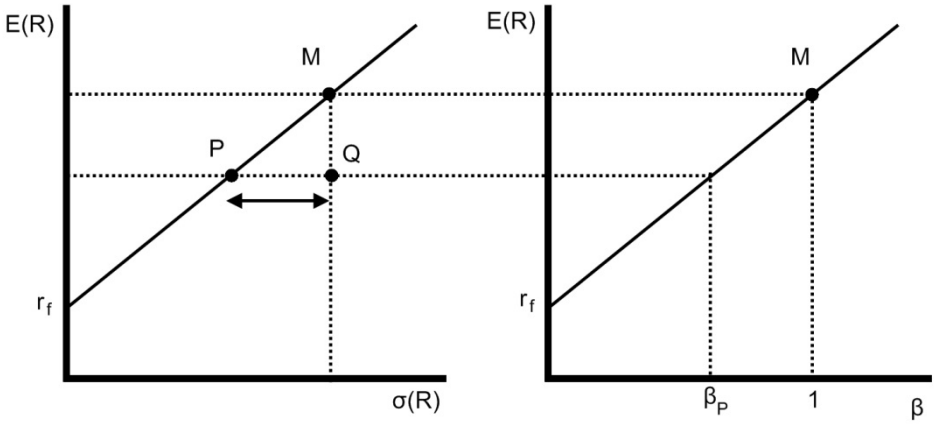


Question: Which of the following statements is **false**?

a. Security A is inefficient.
b. The β of P_1 is equal to the β of A.
c. The level of unique risk of P_2 is equal to that of C.
d. The Sharpe ratio of B is smaller than that of A.

14.

Consider a world in which the assumptions of the CAPM hold. Consider the figure below where M is the market portfolio and Q an individual security:



Question: Which of the following statements is **false**?

a. The systematic risk of Q is lower than the systematic risk of M.
b. The unique risk of Q does not imply a higher expected return for Q.
c. No investor holds Q in his portfolio.
d. The beta of Q is a measure of the level of systematic risk of Q.

15.

Question: Which of the following statements is **true**?

a. If the growth rate of the earnings is positive, the 'trailing' P/E ratio is smaller than the 'forward' P/E ratio of the same enterprise.
b. The enterprise value of a firm is equal to the market value of the equity and the interest bearing debt.
c. The working capital is equal to the current assets minus the current liabilities.
d. The effective annual rate (EAR) is higher as the period over which the interest is credited is longer.

16.

Question: Which of the following statements is **false**?

a. An efficient capital market in the weak form can also be efficient in the semi strong form.
b. An efficient capital market in the semi strong form is also efficient in the weak form.
c. It is not possible to realize abnormal returns in a capital market that is efficient in the strong form.
d. In a market that is inefficient in the weak form, abnormal returns can be achieved by studying historical prices.

See the next pages for **Part B: Open questions**.

Part B: Open questions (18 points)

17. (6 points)
Assume a perfect capital market. The number of outstanding bonds of Koka Kola is 10 million. The remaining maturity of the bonds is 1 year, the nominal value per bond is €1.000,00 and the coupon 5,00%. The yield to maturity of the bonds is 15,00% and the required rate of return is 8,00%. The 1-year spot rate (r_1) is 3.00%

a. Calculate the price in euros of one bond A. Denote your answer in euros with two decimals and show your calculations. (2 points)

b. Determine the de 'credit spread' and the 'risk premium' of one bond A. Denote your answer in percentages with two decimals, and show your calculations. (2 points)

c. Explain what is meant by the 'modified duration'. (2 points)

18. (6 points)
You are given the following facts about firm AHOLT (A) and BELHEIZE (B) as separate entities:

	A	**B**
P/E ratio	14	10
Earnings per Share (EPS)	€5,00	€2,00
Number of outstanding shares	1.000.000	600.000
Earnings	€5.000.000	€1.200.000
Market value of equity	€70.000.000	€12.000.000
Price per share	€70	€20

Firm A prepares to acquire firm B. The offer is partly in new A shares and partly in cash. Shareholders of firm B will receive 4 new A shares for every 10 shares B they own *and* €250 in cash (4 new shares A plus €250 for every 10 shares B). The cash is paid out of the excess amount of cash from A. The synergy created by the acquisition of B by A amounts to a total of € 8.000.000. Both companies are fully financed with equity. Company A seeks to maximize shareholder value for A's current shareholders.

Questions:

a. Calculate the number of outstanding shares A directly after the acquisition of B. Show your calculations. (1 point)

b. Calculate the amount paid in cash to the shareholders of B. Show your calculations. (1 point)

c. Calculate the value of A directly after the acquisition of B.
Show your calculations. (1 point)

d. Calculate the net present value of the acquisition for the shareholders of A.
Show your calculations. (2 points)

e. Should you advise A to continue the acquisition given the conditions mentioned above?
Motivate your answer. (1 point)

19. (6 points)
Assume a perfect capital market. AMSTERDAM BREWERIES N.V. has three different divisions. AMSTERDAM BREWERIES wants to determine the cost of capital for the division FRESH by looking at a comparable listed firm. AMSTERDAM BREWERIES has estimated the beta of the equity and debt of comparable firm 3ES N.V. The activities of 3ES are similar to the activities of division FRESH. The beta of the equity of 3ES is 2,0. The beta of the debt of 3ES is 0,0. The comparable firm is 50% debt financed and has amount of excess cash that is equal to 20% of the total value of its assets (sum of market value equity and debt). ('Net Debt' is 30% of the balance sheet total.) The risk-free interest rate is 1,00% and the market risk premium is 5,5%. Ignore taxes. The management of AMSTERDAM BREWERIES applies the CAPM in determining the cost of capital. AMSTERDAM BREWERIES is 100% financed with equity.

Questions:

a. Calculate the required return on equity of 3ES. Denote your answer in 2 decimals (e.g. 1,23%) and show your calculation. (2 points)

b. Calculate the required return on debt of 3ES. Denote your answer is 2 decimals (e.g. 1,23%) and show your calculations. (1 point)

c. Calculate the cost of capital of division FRESH of AMSTERDAM BREWERIES. Denote your answer in 2 decimals (e.g. 1,23%) and show your calculations. (3 points)