School of Business and Economics

Exam:	Finance (resit)	Version A
Code:	E_IBA2_FIN	
Examinator:	Dr. M.B.J. Schauten	
Co-reader:	Prof. Dr. M.J. van den Assem	
Date:	20 March 2019	
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 3 April 2019.	
Inspection:	Will be announced via Canvas.	
Number of pages:	13 (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 Marco at $t = 0$ and $t = 1$ (CF_0 and CF_1) is €102,00 and €204,00 respectively. The risk-free interest rate is 2,00%. At $t = 0$ Marco lends €42,00 and consumes €20,00 (C_0). At $t = 1$ the proceeds from the real investments are €244,80 (OF). Consider the figure below (not drawn to scale).
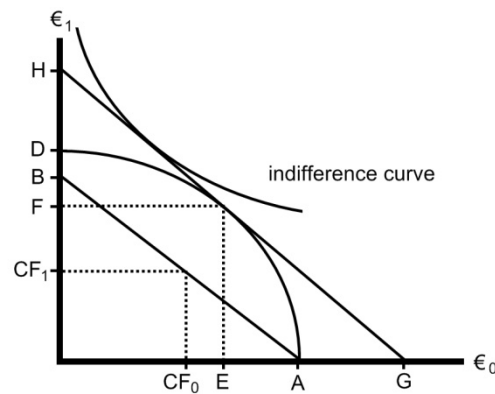

Question: Which of the following statements is **true**?

a.   At $t = 0$ the investment outlay is €40,00 (EA) and the net present value of the real investment projects is €190,00 (AG).

b.   At $t = 0$ the investment outlay is €82,00 (EA) and the net present value of the real investment projects is €158,00.

c.   At $t = 0$ the investment outlay is €40,00 (EA) and the internal rate of return (IRR) of the real investment projects is 512%.

d.   At $t = 0$ the investment outlay is €82,00 (EA) and the internal rate of return (IRR) of the real investment projects is 612%.

2.

Assume a world according to the Hirshleifer model. Anne owns a shop in Rotterdam from which he earns €240,00 at t = 0 (CF_0) and €306,00 at t = 1 (CF_1). Anne wants to expand and invests at t = 0 in a new shop in Amsterdam. The expected proceeds at t = 1 are €183,60 (OF). At t = 0 Anne consumes €250,00 (C_0) and at t = 1 €459,00 (C_1). The risk-free interest rate is 2,00%. Consider the figure below (not drawn to scale).

€$_1$

H

D
B
F

indifference curve

CF$_1$

CF$_0$ E   A   G   €$_0$
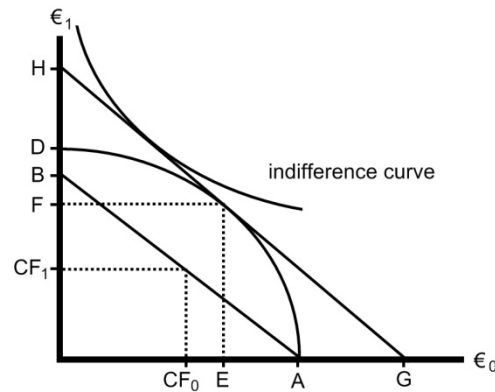
Question: At t = 0 the investment outlay is closest to

a.   €10
b.   €20
c.   €30
d.   €40

3.

On December 31, 2018, the number of outstanding shares of BASIC VIT was equal to 124 million. The price per share was €20,00, cash and cash equivalents were €2,00 bn and payables were €6,00 bn. The market value of interest-bearing debt was €8,00 bn and the book value of equity was €1,48 bn.

Question: On December 31, 2018, the enterprise value of BASIC VIT is closest to

a.   € 7,48 bn
b.   € 8,48 bn
c.   € 9,96 bn
d.   €12,96 bn

4.

The company Orange N.V. is considering the implementation of a new project that now
(t = 0) requires an investment in fixed assets of €6.000. The lifespan of the project is 2 years.
The expected operational cash flows before corporate tax at the end of year 1 and 2 are
€8.000 and €10.000, respectively. The investment of €6.000 is depreciated on a straight line
basis based on historical cost in 2 years to €1.000. This means that the depreciation is €2.500
per year. It is assumed that the machine will be sold for €1.000 at t = 2. The corporate tax
rate is 25%. The cost of capital is 6,00%. Ignore inflation.

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

a.   € 4.650
b.   € 8.371
c.   €10.650
d.   €12.371

5.

Assume a perfect capital market. REWUOB N.V. intends to open a number of new stores.
The table below shows the expected cash flows (in millions of euros) for this project for the
next three years.

| t	0	1	2	3
Expected cash flow	-75,0	5,0	0,0	6,0

Assume that the expected cash flow from t = 3 will increase annually by 3,00%.
For example, the expected cash flow at t = 4 is €6,0 million $\times$ 1,03 and at t = 5
€6,0 million $\times$ 1,03^2. The cost of capital is 8,00%. Ignore corporate tax.

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

a.   €16,5 million
b.   €24,9 million
c.   €32,5 million
d.   €38,9 million

6.

In Chapter 6 of Berk and DeMarzo Figure 6.3 Corporate Yield Curves for Various Ratings is shown. The figure shows the average yield to maturity of bonds without and with default risk. The yellow line is known as the term structure of interest rates.
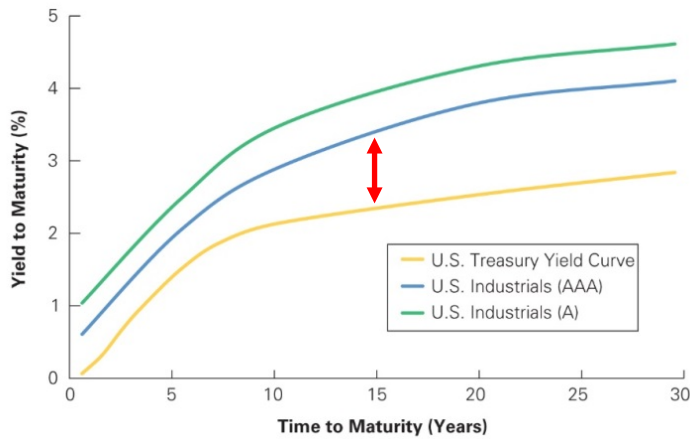
Question: Which of the following statements is **false**?

a. The length of the two-sided arrow in Figure 6.3 reflects the 'risk premium' of bonds issued by US Industrials with an AAA rating and a maturity of 15 years.
b. The length of the two-sided arrow in Figure 6.3 reflects the 'default risk' of bonds issued by US Industrials with an AAA rating and a maturity of 15 years.
c. The length of the two-sided arrow in Figure 6.3 reflects the 'credit risk' of bonds issued by US Industrials with an AAA rating and a maturity of 15 years.
d. The term structure of interest rates is increasing.

7.

Assume a perfect capital market. The following bullet bonds which are free of default risk are traded in this market:

Bond	Remaining maturity	Coupon
A	2 years	4,0%
B	3 years	8,0%

The nominal value of both bond A and B is €1.000. The two-year spot rate (r_2) is 8,0%. The one-year forward rate for the second year ($_1f_2$) is 9,0%. The price of bond B is €933,03.

Question: The three-year spot rate (r_3) is closest to

a. 4,0%
b. 8,0%
c. 9,0%
d. 11,0%

8.

Assume a perfect capital market. The nominal value of bonds A, B and C is €1.000. The bonds are bullet loans and free of default risk.

The following details of bonds A, B and C are known:

Bond	Maturity	Coupon	Price
A	1 years	0,0%	€952,38
B	2 years	0,0%	€907,03
C	3 years	5,0%	€1.000,00

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

a.   The yield-to-maturity of bond A is greater than 6,0%.
b.   The yield-to-maturity of bond B is greater than 6,0%.
c.   The yield-to-maturity of bond C is greater than 6,0%.
d.   The 1-year forward rate for the third year ($_2f_3$) is smaller than 6,00%.

9.

Assume a perfect capital market under certainty. For Companies A and B the following information is given:

	A	B
Earnings per share at t = 1 (EPS$_1$)	€10	€10
Dividend pay-out ratio (constant)	30%	30%
P$_0$	€100	€200

The discount rate applicable to both companies is 10%. For both companies, assume that neither the dividend-payout ratio nor the annual growth rate (g) of earnings and dividend per share will change.

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

a.   The growth rate of the dividend per share of company B is 1,21 times that of A.
b.   The growth rate of the dividend per share of company B is 1,50 times that of A.
c.   The growth rate of the dividend per share of company B is 2,00 times that of A.
d.   The growth rate of the dividend per share of company B is 2,21 times that of A.

10.
Assume a world in which the assumptions of portfolio theory hold. In this world only the two investment objects A and B are traded. It is also known that the standard deviation of the return of A is 10,0% and of B is 20,0%. The expected return of A is 6,0% and of B 14,0%. The correlation coefficient between the returns of A and B is 0,25. x_A (x_B) represents the fraction of a portfolio invested in security A (B). The expected return of the minimum-risk portfolio of risk-bearing securities (MRP) is 7,0%.

Question: For the minimum-risk portfolio of risky investment objects, x_A is closest to

a.   80,0%
b.   82,5%
c.   85,0%
d.   87,5%

11.
Consider a world in which the assumptions of the CAPM hold. In this world only two risk-bearing securities, A and B, are traded. The curve through A and B in the figure below represents the minimum-risk frontier of the risk-bearing securities. Assume that $E(R_{P2}) = E(R_{P3})$ and $\sigma(R_{P3}) = \sigma(R_B)$. It is possible to lend and borrow risk-free against the rate R_F.
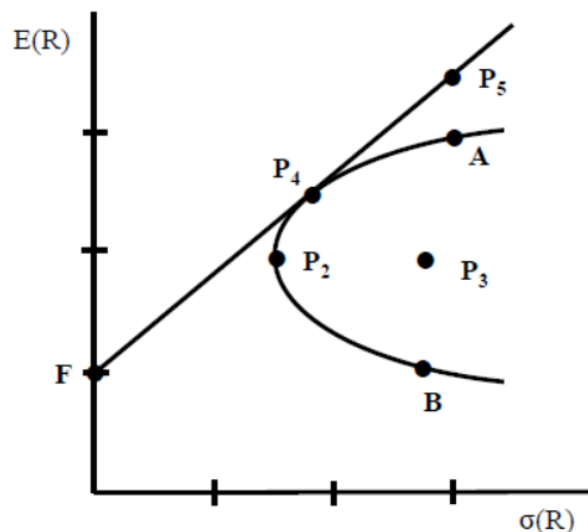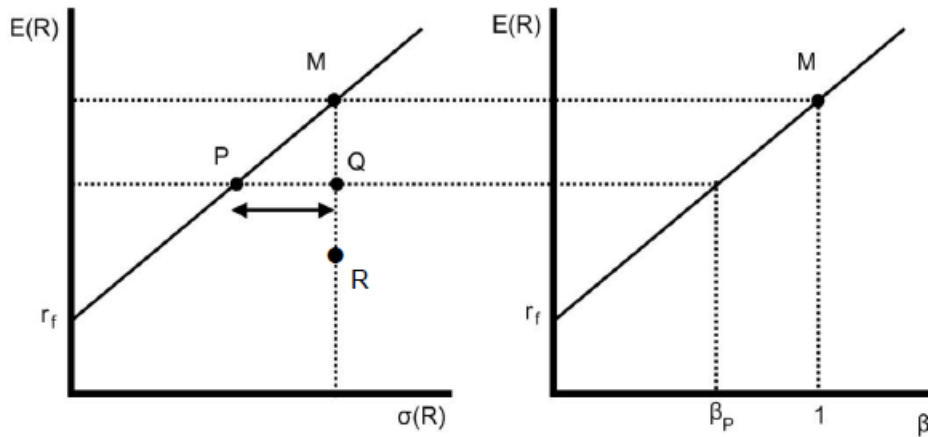

Question: Which of the following statements is **false**?

a. P_5 consists of a short position in F, and a long position in both A and B.
b. P_3 consists of a short position in F, and a long position in both A and B.
c.   The beta of P_3 is equal to that of P_2.
d.   The Sharpe ratio of P_2 is equal to that of P_3.

12.
Consider a world in which the assumptions of the CAPM hold. Consider the figure below where M is the market portfolio and Q and R are individual securities:

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

a.   The systematic risk of Q is smaller than that of R.
b.   The unique risk of R is equal to that of Q.
c.   Q is inefficiënt.
d.   The beta of an individual security cannot exceed 1.

13.
Consider a world that meets the assumptions of the CAPM. The risk-free interest rate is 2%. The expected return of the market portfolio is 9% and the standard deviation of the return of the market portfolio is 25%.

The following is known of security Basic Fat: the standard deviation of the return is 35% and the covariance between the return of Basic Fat and that of the market portfolio is 0,0.

Question: The expected return of Basic Fat is closest to:

a.   2%
b.   4%
c.   7%
d.   9%

14.

Consider a world that meets the assumptions of the CAPM. The market risk premium is 5,00% and the risk-free interest rate is 2,00%. Two investment objects A and B, among others, are traded in this world. Investment object A is efficient, B is inefficient. Of both investment objects the following is known:

	A	B
E(R)	12,00%	7,00%
σ(R)	30,00%	?

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

a. The standard deviation of the return on the market portfolio is 12%.
b. The standard deviation of the return on the market portfolio is 15%.
c. The standard deviation of the return of B is equal to that of the market portfolio.
d. The standard deviation of the return of B is smaller than that of the market portfolio.

15.
Question: Which of the following statements is **true**?

a. If the market is efficient in its weak form, it is - on the basis of publicly available information - impossible to systematically beat the market.
b. If the market is efficient in semi-strong form, it is impossible - on the basis of publicly available information - to systematically beat the market.
c. If the market is efficient in the semi-strong form, technical analysis can be used to systematically achieve abnormal returns.
d. In a market that is efficient in the strong form, no abnormal returns can be achieved.

16.

Company B wants to take over company T. The market value of B as an independent entity is €300 million. Company B is fully financed with equity. The market value of T as an independent entity is €400 million. Company T is financed with debt for €300 million.

Table 1: Data of firm A and B as separate entity

	Firm B	Firm T
Market value equity	€300 million	€100 million
Market value debt	€0 million	€300 million
Total value firm	€300 million	€400 million

The acquisition will be financed by the issue of new shares B. The synergies amount to €150 million ('gain' = €150 million). The merging of the two companies reduces the risk for the lenders. As a result, the market value of the debt increases from €300 million to €320 million.

Question: The market value of B's equity capital immediately after the acquisition of T is closest to:

a.   €300 million
b.   €400 million
c.   €530 million
d.   €550 million

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

Part B: Open questions (18 points)

17.
A company has two mutually exclusive investment projects. For each of the projects the required investment outlay at t = 0 is €5 million. Project 1 is expected to generate an annual cash flow of €1 million from t = 2 to infinity (growth is 0%). The expected cash flow at t = 1 is €0. Project 2 is expected to generate an annual cash flow from t = 1 onwards that increases by 2% each year after t = 1. The cash flow at t = 1 is €1,5 million (and at t = 2 €1,5 million × 1,02 etc.). When selecting one of the two projects, value creation is the selection criterion. Each project can only be executed once. The cost of capital of both project 1 and project 2 is 10,0%.

Questions:

a. Determine the net present value of project 1 in millions of euros. Round off your answer to two decimal places. Show your calculation. (1 point)

b. Determine the net present value of project 2 in millions of euros. Round off your answer to two decimal places. Show your calculation. (1 point)

c. Calculate the internal rate of return for project 2. Round off your answer to two decimal places (e.g. 1,23%). Show your calculation. (2 points)

d. Which project should be prefered? Motivate your answer. (2 points)

18. (6 points)

The table below shows the data of companies B(idder) and T(arget) as independent entities. B takes over T. B pays the shareholders of T with 100.000 new shares. The synergy through the acquisition of T by B amounts to zero.

	B	T
Value equity	€40 million	€10 million
P/E ratio	20	8
Number of shares	400.000	250.000
Price	€100	€40
EPS	?	?

Questions:

a. Calculate the earnings per share of B immediately before the acquisition of T. Show your calculation. (1 point)

b. Calculate the earnings per share of B immediately after the acquisition of T. Show your calculation. (2 points)

c. Calculate the price per share of B immediately after the acquisition of T. Assume that the market cannot be misled. In other words, assume an efficient capital market. Show your calculation. (1 point)

d. Suppose that financial market is not efficient and that it is possible to mislead the market: suppose that the companies can convince the market that the P/E ratio of B immediately after the acquisition of T is equal to the P/E ratio of B immediately before the acquisition of T.

   Under this assumption, is the takeover beneficial for the shareholders of B?
   Motivate your answer. A calculation is not necessary. (2 points)

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 ALCOHOLICS by looking at a comparable listed firm. AMSTERDAM BREWERIES has estimated the beta of the equity and debt of comparable firm BRAVARIA N.V. The activities of BRAVARIA are similar to the activities of division ALCOHOLICS. The beta of the equity of BRAVARIA is 2,0. The beta of the debt of BRAVARIA is 0,0. The comparable firm is 40% debt financed and 60% equity financed and has no excess cash. The risk-free interest rate is 2,00% and the expected return on the market portfolio is 9,00%. Ignore taxes. The management of AMSTERDAM BREWERIES applies the CAPM in determining the cost of capital. AMSTERDAM BREWERIES is 80% equity financed and has an excess amount of cash at its disposal for 20% of its balance sheet total (market value of the equity and debt). This excess amount of cash is not part of the ALCOHOLICS division. The beta of debt of AMSTERDAM BREWERIES is 0.0.

Questions:

a. Calculate the return required by the debtholders of AMSTERDAM BREWERIES. Round off to 2 decimal places (e.g. 1,23%) and show your calculations. (1 point)

b. Calculate the cost of capital of the ALCOHOLICS division of AMSTERDAM BREWE-RIES. Round off to 2 decimal places (e.g. 1,23%) and show your calculations. (3 points)

c. Is it possible - on the basis of the information provided - to determine the return required by the equity providers of AMSTERDAM BREWERIES? Please justify your answer. (2 points)