School of Business and Economics

Exam:	Finance (Midterm test 1)	Version A
Code:	E_IBA2_FIN	
Examinator:	Dr. M.B.J. Schauten	
Co-reader:	Prof. Dr. M.J. van den Assem	
Date:	12 November 2019	
Time:	13:00 – 14:30 hrs	
Duration:	1,5 hours	
Calculator allowed:	Yes	
Graphical calculator allowed:	No	
Number of questions:	16	
Type of questions:	multiple choice	
Answer in:	English	
Remarks:	Answer the **multiple choice questions** by filling the corresponding box on the mc-answering form. Only one answer is correct (a, b, c or d). If you give more than one answer or no answer then your response is counted as wrong. Numbers are written in European (Dutch) format with decimal commas, and dots separating thousands (e.g. 1.234.567,89). **Write your name on the mc-answering form as well as on this exam form. At the end of the exam you hand in the mc-answering form as well as the exam form with the supervisor**.	
Credit scores:	To determine the score we take into account the expected number of correct answers when answers are given randomly. Number of points = (number of correctly answered questions – 4) × 7,5. The final grade for this exam is: [number of points + 10] / 10.	
Grades:	The grades will be made public at the latest on 26 November 2019.	
Number of pages:	9 (including front page)	

Name : _____

Student number : _____

1.
Assume a world according to the Hirshleifer model. At t = 1 Robert consumes €40,80 (C_1). The income of Robert at t = 0 and t = 1 is equal to €60,00 (CF_0) and €20,40 (CF_1), respectively. The risk-free interest rate is 2,00%. The net present value of the real investment projects is €30,00.

Question: At t = 0 the consumption of Robert (C_0) is closest to

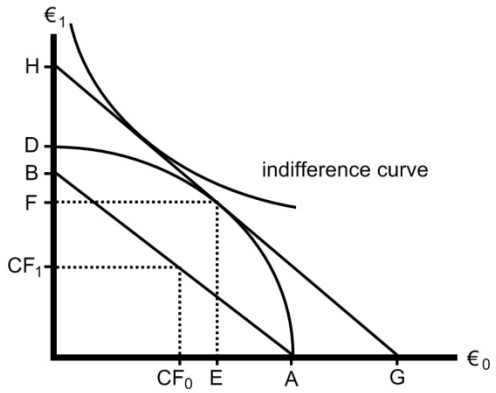
a. €0,00
b. €30,00
c. €40,00
d. €70,00

2.
Assume a world according to the Hirshleifer model. The income of William at t = 0 and t = 1 is equal to €15,00 (CF_0) and €61,20 (CF_1), respectively. The total wealth of William at t = 1 (or his maximum consumption at t = 1) is €112,20. The risk-free interest rate is 2,00%.

Question: The net present value of the real projects William will invest in is closest to

a. €30,00
b. €35,00
c. €40,00
d. €45,00

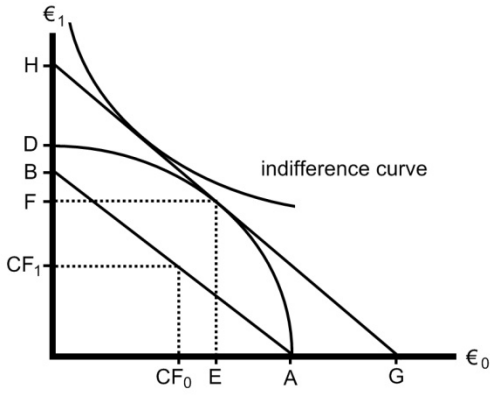
3.
Assume a world according to the Hirshleifer model. The income of Paul at t = 0 and t = 1 is €55,00 (CF_0) and €32,64 (CF_1), respectively. The investment in real projects at t = 0 (EA) generates proceeds at t = 1 of €61,20 (OF). The risk-free interest rate is 1,00%. At t = 0 Paul consumes €15,00 (C_0) and neither lends nor borrows money. Consider the figure below (not drawn to scale).



Question: The internal rate of return of the real investment projects is closest to

a. 53%
b. 83%
c. 153%
d. 183%

4.
Assume a world according to the Hirshleifer model. At t = 0 the income of Noor is €75.000 (CF_0) and at t = 1 her income is zero. At t = 0 Noor invests €50.000 in real investment projects (EA). The proceeds of this investment at t = 1 are €63.000 (OF). At t = 0 Noor borrows €40.000 and at t = 1 she pays €2.000 in interest. The net present value of the investment in real projects is €50.000 (AG). Consider the figure below (not drawn to scale).



Question: The consumption at t = 0 and at t = 1 is closest to

a. €64.000 and €22.000 respectively
b. €65.000 and €21.000 respectively
c. €64.000 and €21.000 respectively
d. €65.000 and €22.000 respectively

5.
Assume a world without risk. You will receive five cash flows of €500: one today (t = 0) and subsequently one at the end of each of the next 4 years (so at t =1, t = 2, t = 3 and t = 4). The risk-free interest rate is 2,00%.

Question: At t = 0 the present value of this series of cash flows (including the receipt at t = 0) is closest to

a. €1.904
b. €2.104
c. €2.404
d. €2.414

6.
Suppose you put €1.000 into a savings account each year. You start saving at the beginning of year 1 (t = 0) and stop after year ten (t = 10). Hence at t = 0 you make your first deposit of €1.000 and at t = 10 you make your last. Hence in total you deposit €11.000. Assume an interest rate of -0,50% on an annual basis. The interest is *deducted* annually. In the meantime, you do not withdraw money.

Question: The amount you have saved including the negative interest is immediately after t = 10 closest to

a. € 9.767
b. € 9.777
c. €10.729
d. €11.297

7.
The table below summarizes two risky securities (A and B) whose cash flows extend over three periods. At the three different points in time, there are two possible states ('bad state' and 'good state'), each with a probability of 50%.

Table 1: overview of cash flows in euros of one security A and one security B at time *t*

	Security A		Security B	
Point of time	Bad state	Good state	Bad state	Good state
1	60	30	120	60
2	60	30	120	60
3	60	30	120	60

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

a. If the price of one security A is equal to €150 and of one security B €300, then it is possible to make an arbitrage profit by going long in A and short in B.
b. If the price of one security A is equal to €150 and of one security B €310, then it is possible to make an arbitrage profit by going long in A and short in B.
c. If the price of one security A is equal to €150 and of one security B €290, then it is possible to make an arbitrage profit by going long in A and short in B.
d. If the price of one security A is equal to €160 and of one security B €290, then it is possible to make an arbitrage profit by going long in A and short in B.

8.
On December 31, 2018, the number of outstanding shares of ADJEN is 30 million. On that date, the price per share was €475; the book value of the non-current assets was €224 million; the market value of the interest-bearing debt with a maturity of less than one year was €1.100 million and that of interest-bearing debt with a maturity of more than one year was €0; the book value of shareholders' equity was €660 million; the book value of accounts receivable was €42 million and the book value of the accounts payable was €0. The amount of cash and cash equivalents was €1.200 million.

Question: On December 31th 2018, the enterprise value of ADJEN is closest to

a. €13.250 million
b. €13.350 million
c. €14.150 million
d. €14.350 million

9.

Entrepreneur FELIKS rents out scooters. FELIKS wants to know what the optimal economic life of a scooter is. The purchase price of a scooter is €4.000 and a scooter can technically be used for a maximum of 4 years. To keep things simple, FELIKS wants to know what's best: i) replace scooters each two years, or ii) replace scooters each four years. If a scooter is replaced after two years, it will earn €1.000 on sale. If the machine is replaced at the end of the fourth year, the expected proceeds of the divestment will be zero. The operational cash flow from renting out a scooter amounts to €1.350 per year. Assume that the productivity of new scooters is the same as of old scooters. Ignore inflation. The cost of capital is 10,00%. Assume FELIKS aims to maximize shareholder value and that there are no taxes.

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

a. For FELIKS it is better to replace scooters every four years.
b. For FELIKS it is better to replace scooters every two years.
c. The net present value of an investment in a scooter, which is then used for two years and sold at the end of the second year for €1.000,- (and then not replaced) is €279,-.
d. The net present value of an investment in a scooter, which is then used for four years and sold at the end of the fourth year for nihil (and then not replaced) is €179,-.

10.

At t = 0, project X requires an investment outlay of €1.000. The expected cash flow generated by the project amounts to €100 at t = 1 and will then increase by 2,00% per year up to infinity. The required return has yet to be determined.

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

a. It is possible to determine the internal rate of return (irr) of the project using the data above.
b. It is possible to determine the net present value of the project using the data above.
c. It is possible to determine the profitability index of the project using the data above.
d. It is possible to determine the economic payback period of the project using the data above.

11.
Company SONOZ is considering the implementation of project LOUD. In order to start the project, investments only need to be made at t = 0. The residual value of the investment is €0. There are no taxes. The project requires a one-off investment outlay at t = 0 and generates a cash flow at t = 1 only. The investment outlay amounts to €100,00 and the net present value is €20,00. The required rate of return is 10,00%.

Question: The internal rate of return of the project is closest to

a. 10%
b. 12%
c. 30%
d. 32%

12.
The expected cash flows of the BLUESTAR project in euros before taxes are shown in Table 2. The applicable corporate tax rate is 20,00%. Ignore other taxes and inflation. The investment outlay (at t = 0) for the BLUESTAR project amounts to €800,00 and is depreciated to zero on a straight-line basis over two years. The required rate of return is 5,00%.

Table 2: Expected cash flows before taxes in euros

CF_t	**Project BLUESTAR**
CF_0	− 800,00
CF_1	420,00
CF_2	441,00

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

a. The after tax cash flow is negative at t = 1 and at t = 2.
b. The after tax cash flow is negative at t = 1 but positive at t = 2.
c. The after tax cash flow is negative at t = 2 but positive at t = 1.
d. The net present value of the project is negative.

13.
Company LOYALTY is considering the implementation of a new project that now (t = 0) requires an investment in a machine of €40.000. The expected operating cash flows before corporate tax (measured in real terms) at the end of year 1 and 2 amount to €50.000 and €70.000 respectively. The investment of €40.000 is depreciated on a straight-line basis in two years on the basis of historical cost to €10.000 (in nominal terms). It is assumed that the machine will be sold at t = 2 for €14.000 (in real terms). The corporate tax rate is 25,00%. A constant inflation rate of 2,00% per annum is expected for the coming years.

Question: The nominal cash flow (including the proceeds of the divestiture) after tax at t = 2 is closest to

a. €54.327
b. €57.301
c. €71.795
d. €72.580

14.
Question: Which of the following statements is **true**?

a. An increase in net working capital over a given period does not affect the free cash flow generated during the same period.
b. An increase in net working capital over a given period has a negative impact on the free cash flow generated during the same period.
c. An increase in net working capital over a given period can have a positive or a negative impact on the free cash flow generated during the same period.
d. The magnitude of the net working capital can be determined on the basis of data from the profit and loss account.

15.
The profitablity index (PI) of project X is 1,5 and of project Y 2,0. The PI is defined as the present value of the expected cash flows from t = 1 divided by the investment expenditure at t = 0. For project X, the investment outlay at t = 0 is € 2,0 million and for project Y it is €1,5 million.

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

a. The net present value of project X is €1,0 mln and that of Y €1,5 mln.
b. The net present value of project X is € 3,0 mln and that of Y € 3,0 mln.
c. The internal rate of return of project X can be calculated on the basis of the above data.
d. The required rate of return of X can be calculated on the basis of the above data.

16.
Chapter 8 of Berk and DeMarzo discusses the calculation of the Free Cash Flow.

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

a. Free Cash Flow =
(Revenues – Costs – Depreciation) × $(1-\tau_c)$ + Depreciation – CapEx – ΔNWC
b. Free Cash Flow =
(Revenues – Costs – Depreciation) × $(1-\tau_c)$ – Depreciation – CapEx – ΔNWC
c. Free Cash Flow =
(Revenues – Costs + Depreciation) × $(1-\tau_c)$ + Depreciation – CapEx – ΔNWC
d. Free Cash Flow =
(Revenues – Costs + Depreciation) × $(1-\tau_c)$ – Depreciation – CapEx – ΔNWC

where τ_c is the corporate tax rate, CapEx is the Capital Expenditures, and ΔNWC is the change in net working capital.

End of test