

1st Part: 35 Marks. All answers shall be given in the space available. All True/False questions have equal marking. During the test there won't be any comments or questions given. Write your name and number on every sheet. No mobile phones are allowed at any time.

Name: \_\_\_\_\_ Number: \_\_\_\_\_

In the following group of questions, every right answer has 2.5 marks each, wrong answers have -2.5 each (2.5 penalty mark). [Each group of questions will have a mark between 0 (minimum) and 10 (maximum)]  
 Write True (T) or False (F), with an X in the appropriate entry.

**1. Consider the following financial operations:**

	T	F
Leasing is a financial means but it is not a loan.	✓	
A bond loan issued above the par, and subscribed completely, gets a money inflow higher than the loan value.	✓	
In a loan repayment with equal payments principal amortization is always constant.		X
A coupon zero bond loan is always more beneficial to the issuer because it does not pay interest.		X

**2. Consider the following situations:**

	T	F
A €100,000 loan is redeemed five times with constant principal payments. None of the individual total payments is higher than €20,000.	✓	
For rate $i > 0$ , we have that $a_{\overline{n} i} > n$ .		X
Consider a bond loan issued at the par where redemption is paid with a premium. Investor's yield rate is higher than the coupon rate.	✓	
Shares of a public company pay interest if they are lent at issuance.		X

In the next group of questions, tick ✓ or write X in the box next to the answer you consider to be correct (only one is). In each group, a correct answer has 5 marks and a wrong answer gets -1.25 marks (penalty 1.25).

3. "Zach SA" signed today an acquisition contract for an industrial equipment with a payment plan with two installments. Values and due dates are: from today, €6,400 within six months and €7,200 within 18 months, respectively. Compound interest and an annual interest rate of 6% are applied, compute the acquisition value of the equipment.

- a) €12,793.10 ; b) €12,813.64 ; c) €13,600.00 ; d) None of the others
- $6400(1.06)^{0.5} + 7200(1.06)^{1.5} \approx 12813.64$

4. Zach did an application of €5,000 in "Treasury Bonds Special Plus" with a maturity of five years, compound interest, and annual interest rates according to the table:

Year	1	2	3	4	5
Interest rate	3.00%	3.00%	5.00%	6.00%	8.00%

Compute the yield rate for this financial application (approximately).

- a) 4.98% ; b) 5.00% ; c) 5.28% ; d) 5.50%

$1.03^3(1.05)(1.06)(1.08) = (1+i)^5 \rightarrow \sim 4.98\%$

5. From a loan, Zach will receive back 12 monthly installments of €200.00 each, where the first is due within three months from today. For monthly effective rate of  $i_M = 1\%$ , calculate the loan amount (approximately).

- a) €2,228.73 ; b) €2,251.02 ; c) €2,400.00 ; d) None of the others

$200 a_{\overline{12}|1\%} (1.01)^{-2} \approx 2205.66$

2<sup>nd</sup> Part (65/100 marks)

In this group write your calculations in the space below the question and write the final answer in the box provided. Do not forget to present all formulae and intermediate calculations needed.

1. (40 marks)

"Zach PLC" issued a bond loan under the following terms:

- Issuance date: 01/01/2016;
- Face value: €10.00;
- N° of bonds, above the par: 120,000;
- Issue value: €10.20;
- Maturity: 3 years;
- Coupon annual interest rate, compounded semi-annually: 6%;
- 1st redemption, 1 year after issuance;
- Coupon paid semi-annually, 1st payment on 01/07/2016;
- Principal constant payments, annually;
- Redemption premium: €0.20 per bond in the 1st year and €0.30 in the following.

$$i_s = 0.03$$

a) Compute the value of the loan.

$$V_{\text{loan}} = 120\,000 (10.00) = \text{€ } 1\,200\,000$$

$$\text{Premium} = 0.2 (120\,000) = \text{€ } 24\,000$$

R: € 1 200 000.00 → just loan

b) Fill up the Amortization Schedule, for the **1st year and half**, only:

Semester

Time	Initial Balance	Interest	No. of Bonds redeemed	Principal	Premium	Payment	Outstanding Balance
1	1200000	36000	—	—	—	36000	1200000.00
2	1200000	36000	40000	400000	24000	460000	800000.00
3	800000	24000	—	—	—	24000	800000.00

c) Mr. Zappa bought 50 bonds immediately after the payment of the 3rd coupon and kept them until maturity (last redemption). He got an yield rate of 11%, **write the equation** that allows to calculate how much money this investor spent for buying the 50 bonds.

let  $r$ : yield rate and  $r^* = (1.11)^{1/2} - 1$ ; and

$$\text{Money spent} = 10(0.03) 50 a_{\overline{3}|r^*} + 50(10.30) \frac{(1.11)^{-1.5}}{(1+r^*)^{-3}}$$

R:

**2. (25 marks)**

A "Zach PLC" is acquiring an automobile through a leasing contract. Contract value is €20,000. The company received the following proposal from *LeasingAuto, Ltd*:

- Quarterly interest rate: 2%;
- Values to be paid:
  - Initial payment, in the contract signing date: 5% of the purchase value;
  - 12 quarterly installments: Immediate and constant, the first to be paid 3 months after the contract signing date;
  - Residual value: 10% of purchase value, to be paid together with the last installment.

a) Calculate the amount of each quarterly installment.

$$\text{Initial: } 0,05(20,000) = 1,000, \quad \frac{i^{(4)}}{4} = 0,02, \quad RV = 0,1(20,000) = 2,000$$

$$20,000 = 1,000 + R a_{\overline{12}|2\%} + 2000(1,02)^{-12}$$

$$R \approx 1647,51$$

R: $\sim \text{€ } 1647,51$
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b) Calculate the amount yet to be paid one year after the contract date, immediately after the payment of the respective installment.

yet to be paid: 8 installments, with P.V. =  $R a_{\overline{8}|2\%}$   
 (after 1 year)  $\approx 12\,068,83$

R: $\sim 12\,068,83\text{€}$
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