ANSWERS MIDTERM TEST 1, 12 NOVEMBER 2019 (draft)

Number of points = (number of correctly answered questions – 4) × 7,5

Grade = (number of points + 10) / 10

GROUP 1 / GROUP 2

1./7. Answer: d
$C_0 + C_1/(1+r) = CF_0 + CF_1/(1+r) + NPV$

$C_0 = - C_1/(1+r) + CF_0 + CF_1/(1+r) + NPV = -40,80/1,02 + 60,00 + 20,40/1,02 + 30,00 = 70,00$

2./8. Answer: b
[maximum consumption at t = 0] = [maximum consumption at t = 1] / (1+r)
= 112,20/1,02 = 110,00

[maximum consumption at t = 0] = $CF_0 + CF_1/(1+r) + NPV = 110,00 \Rightarrow$
$NPV = 110,00 – CF_0 – CF_1/(1+r)$ = 110,00 – 15,00 – 61,20/1,02 = 35,00

3./9. Answer: a
At t = 0 remains for real investments: $CF_0 – C_0 = 55,00 – 15,00 = 40,00$
The internal rate of return of the real investment projects is 61,20/40,00 -1 = 53%

4./10. Answer: b
The interest is 2.000/40.000 = 5,00%
$C_0 = CF_0$ + amount borrowed – investment outlay = 75.000 + 40.000 – 50.000 = 65.000
$OG = CF_0 + CF_1/(1+r) + NPV$ = 75.000 + 0 – 50.000 + 63.000 / 1,05 = 85.000
$OG = C_0 + C_1 / (1+r) \Rightarrow C_1 = (OG – C_0)(1+r)$ = (85.000 – 65.000)(1,05) = 21.000

5./11. Answer: c
$CW = 500 + 500/1,02 + 500/1,02^2 + 500/1,02^3 + 500/1,02^4 = 2.403,86$

or

$$PV_T = A + \frac{A}{R}[1-(1+R)^{-T}] = 500 + \frac{500}{0,02}[1-(1,02)^{-4}] = 2.403,86$$

6./12. Answer: c
The present value of an annuity that starts at t = 0 and ends at t = 10:

$$A + \frac{A}{R}[1-(1+R)^{-T}] = \frac{1.000}{-0,5}[1-(1+-0,005)^{-10}] = 11.280,59$$

The value at t = 10 is 11.280,59 ×(0,995)^10 = 10.729,08

7./13. Answer: b
Since the cash flow profile of B is equal to that of 2A, in a situation where there is no possibility of arbitrage, the price of 2A should be equal to the price of B instrument. In order to make use of the possibility of arbitrage, it is necessary to go short in the bonds that are relatively high priced and to go long in bonds that are relatively low priced. Therefore, answer b is correct as the price of B is > 2 × price of A.

8./14. Answer: c
Enterprise value = market value equity + market value interest bearing debt – cash = 30 mln × 475 + 1.100 mln – 1.200 mln = 14.250 mln – 100 mln = 14.150 mln

9./15. Answer: a
Replace the machine after four years is optimal:

NPV divest after 2 years = -4.000 + 1.350 / 1,1 + (1.350 + 1.000) / $1,1^2$ = -831
NPV divest after 4 years = -4.000 + 1.350 / 1,1 + 1.350 / $1,1^2$ + 1.350 / $1,1^3$ + 1.350 / $1,1^4$ = 279

Since the NPV of using a scooter for two years is negative already, investing twice (once at t=0 and once at t=2) in a scooter that each will be used for two years only, will result in an NPV that certainly is unattractive compared to investing in a scooter that will be used for four years.

10./16. Answer: a
The internal rate of return is the rate at which the NPV of the project is equal to zero:
NPV = - I + (CF/(irr – g)) = 0
NPV = -1.000 + (100/(irr – 0,02)) = 0 ⇒ (100/(irr – 0,02) = 1.000 ⇒ (irr – 0,02) ×1.000 = 100 ⇒ (irr – 0,02) = 0,1 ⇒ irr = 0,12

In order to calculate the NPV, PI and economic payback period, in addition to an estimate of the expected cash flows, the required rate of return is required as well.

11./1. Answer: d
Calculation CF_1:
NPV = - 100 + CW = 20 → CW = 120
PV = CF_1 / (1+r) → CF_1 = PV × (1+r) = 120 ×1,1 = 132

Calculation internal rate of return (irr):
NPV = - 100 + PV = 0 → PV = 100
PV = CF_1 / (1+irr) → (1+irr) = CF_1/PV = 132 / 100 = 1,32 → irr = 32%

12./2 Answer: d
The profit before tax is equal to the cash flow before tax - depreciation costs.
The depreciation costs are equal to 400 per year. The annual tax is equal to 20% × profit before tax. The cash flow after tax is equal to the cash flow before tax less tax. The NPV is then calculated on the basis of the cash flow after tax. See the table below for the results of the calculations.

NB NPV = - 800 + 416/1,05 + 432,8 / $1,05^2$ = -11,2

CF_t	Cash flow before tax	Result before tax	tax	Result after tax	Cash flow after tax	Present value
CF_0	-800				-800,0	-800,0
CF_1	420	20	4	16	416,0	396,2
CF_2	441	41	8,2	32,8	432,8	392,6
					NPV	-11,2

13./3. Answer: c.
Annual depreciation charges in nominal terms: (€40.000-€10.000)/2 = €15.000

Book value of the machine at t = 2 is €10,000. The expected proceeds from the sale at t = 2 are €14,000 in real terms and €14,000 ×1.022 = 14,565.60 in nominal terms. The expected book profit on t = 2 amounts in nominal terms to €14,565.60 – €10,000 = €4,565.60.

Taxable profit on t = 2 is in nominal terms:
70,000 × 1.022 – 15,000 + book profit on sale of the machine =
€72.828 – €15.000 + €4.565,60 = €62.393,60

The tax on t = 2 is: 25% × €62,393.60= €15,598.40

The nominal cash flow after tax at t = 2 is equal to the nominal cash flow before tax including the proceeds of the divestment less tax:
€72.828 + €14.565,60 - €15.598,40 = €71.795,20.

14./4. Answer: b
The greater the increase in net working capital, the lower the free cash flow. The net working capital can be calculated on the basis of data from the balance sheet, not from the profit and loss account.

15./5. Answer: a
NPV of X = - I + PV(CF) = - 2,0 + 1,5×2 = 1,0
NPV of Y = - I + PV(CF) = - 1,5 + 2 × 1,5 = 1,5

The internal interest rate cannot be determined. This requires estimates of the expected cash flows. The required return cannot be calculated on the basis of the information provided either.

16./6. Answer: a
See BDM p. 281