**Answers Exam Finance dd 19 December 2018 (preliminary)**

**MULTIPLE CHOICE QUESTIONS (72 points)**

Number of points mc questions = (number of correctly answered questions – 4) × 6

1./11. Answer: a
$C_1$ = 204 = $CF_1$ – redemption plus interest + proceeds project
= 51 – 40 × 1,02 + proceeds project
proceeds project = 204-51+40 ×1,02 = 193,80

Or

$C_0 = CF_0$ + amount borrowed – investment outlay = 100 + 40 – 20 = 120. $C_1$ = 204
$OG = C_0 + C_1 / (1+r) = 120 + 204/1,02 = 320$
$AG = OG – OA = 320 – (CF_0 + CF_1/(1+r)) = 320 – (100 +51,00/1,02) = 170$
$AG = -I + OF/(1+r) = -20 + OF/(1+r) = 170 \Rightarrow OF/(1+r) = 190 \Rightarrow OF = 193,80$

2./12. Answer: a
$OG = CF_0 + CF_1 + AG = 250 + 306 / 1,02 – 500 + 765 / 1,02 = 800$
$OG = C_0 + C_1 / (1+r) = C_0 + 816 / 1,02 = 800 \Rightarrow C_0 = 0$

3./13. Answer b
CF after tax = CF before tax minus tax
Annual depreciation: 60/2 =30
Tax year 1: 25% × (80-30) = 12,5
Tax year 2: 25% × (120-30) = 22,5

$NPV = -60 + (80-12,5)/1,1 + (120-22,5)/1,1^2 = -60 + 61,36 +80,58 = 81,94$

4./14 . Answer: c
Annual depreciation: (7.000-1.000)/3 = 2.000
Operational profit before tax: 8.000 – 2.000 = 6.000
Tax operational profit: 25% × 6.000 = 1.500
*Operational cash flow after tax = 8.000 – 1.500 = 6.500*

Book profit divestment fixed assets = 2.250 – 1.000 = 1.250
Tax over book profit divestment fixed assets = 25% × 1.250 = 312,50
*Proceeds divestment fixed assets after tax = 2.250 – 312,50 = 1.937,50*

*Total cash flow after tax: 6.500 + 1.937,50 = 8.437,50*

5./15. Answer: d
Niko will invest in project C since project C has the highest NPV.

NPV of A = -1.000 + 1.600/1,10 = 455
NPV of B = -1.000 + 1.800/1,12 = 607
NPV of C = -2.000 + 3.600/1,14 = 880

IRR of A is 1.600/1.000 – 1 = 60%
IRR of B is 1.800/1.000 – 1 = 80%
IRR of C is 3.600/2.000 – 1 = 80%

6./16. Answer: d

a. $P_A = 1.000 = 1.050/(1+y) \rightarrow y = 5\%$ and
   $P_A = 1.000 = 1.050/(1+r1) \rightarrow r_1 = 5\%$
b. $P_B = 826,45 = 1.000 / (1+y)^2 \rightarrow y = (1.000/826,45)^{0,5} -1 = 10\%$ en
   $P_B = 826,45 = 1.000 / (1+r_2)^2 \rightarrow r_2 = (1.000/826,45)^{0,5} -1 = 10\%$
c. ${}_1f_2 = (1+r_2)^2/(1+r_1) – 1 = 1,1^2/1,05 -1 = 15,2\%$
d. $P_C = 50 / (1+r_1) + 50 / (1+r_2)^2 + 1.050/(1+r_3)^3 = 877,82 \rightarrow$
   $1.050/(1+r_3)^3 = 877,82 - 50 / 1,05 + 50 / 1,1^2 = 788,87864 \rightarrow$
   $r_3 = (1.050/788,87864)^{1/3} -1 = 10,0\%$
   ${}_2f_3 = (1+r_3)^3/(1+r_2)^2 = 1,10^3/1,10^2 = 10,0\%$

7./1. Answer: b

a. False. The duration is equal to the weighted average maturity where CFt as fraction of the price of the bond is the weighting factor. Since A is a zero coupon bond, the duration of A is equal to 10 and that of B is less than 10.
b. True. Since the coupon of A is lower than that of B and the maturity of A is equal to that of B, the price of A is lower than that of B.
c. False. The yield of B is determined by $r_1$-$r_{10}$ while the yield of A is determined by $r_{10}$ only. Since the term structure of interest rates is increasing, the yield of A is higher than that of B.
d. False. The one year forward rate is greater than 1,00% since $r_2 > r_1$.

8./2. Answer: b
g = retention ratio × roni = 40% × 12% = 4,8%

$P_0 = 0,6 / 0,1-0,048 = 11,54$

9./3. Answer: a
According to the expectations theory, the forward rate = expected spot rate. See slides week 3.

10./4. Answer b
For A applies:
$P_0 = div_1 / (r-g)$
$100 = 3 / (0,1-g) \rightarrow g = 7\%$

For B applies:
$P_0 = div_1 / (r-g)$
$100 = 4 / (0,1-g) \rightarrow g = 6\%$

11./5. Answer: a
(1,07 × 1,02) - 1

12./6. Answer: a

a. True. If A performs better than expected, B performs worse than expected → the correlation coefficient is negative → the covariance is negative.
b. False. The variance cannot by definition be negative.
c. False. The risk of A is equal to the risk of B. The deviations from the expected return are always the same.
d. False. See a.

13./7. Answer: c

a. True. A is below the efficient frontier. That is a line that can be drawn from Rf and touches the curve.
b. True. The return of P1 is after all equal to that of A.
c. False. The risk of P2 is equal to the risk of C while the expected return of C is higher. The unique risk of P2 is greater than that of C.
d. True. Sharpe ratio $i = (E(R_A)-R_f) / \sigma(R_i)$

14./8. Answer: c

Q is part of M. So Q is also held in M.

15./9. Answer: c

a. False. The trailing P/E ratio is higher. $P_0/EPS_0 = (1+g) \times P_0/EPS_1$
b. False. De enterprise value is equal to the market value of equity and interest bearing debt minus cash.
c. True.
d. False. EAR = (1+APR/n)^n – 1

16./10. Answer: c

In a market that is efficient in the strong form, abnormal returns can be realized by chance. It is not possible to systematically earn abnormal returns.

**Open questions**

17.

a. (2 points)

Price = promised payment / (1+ yield) = 1.050 / 1,15 = 913,04

b. (2 points)

The credit spread (or default spread) is equal to the yield to maturity minus the spot rate = 15,00% - 3,00% = 12,00%.

The risk premium is equal to the required return minus the spot rate = 8,00% - 3,00% = 5%

c. (2 points)

The modified duration reflects the sensitivity of the price of the bond to changes in the yield. If, for example, the yield rises by 1%, the price of the bond falls by about 1%.

18.

a. Old number of shares + new number of shares = 1.000.000 + 600.000/10 × 4 = 1.240.000
b. 600.000 / 10 × 250 = 15 mln
c. Value A after acquisition of B = value of A + value of B + synergy – cash = 70 million + 12 million + 8 million – 15 million = 75 million
d. NPV = Wealth after minus wealth before = 1.000.000/1.240.000 × 75 million – 70 million = - 9,5 mln
e. No, since the NPV is negative.

19.

a. $Re = Rf + \beta \times (Rm - Rf) = 1\% + 2 \times 5{,}5\% = 12\%$
b. $Rd = Rf + \beta \times (Rm - Rf) = 1\% + 0{,}0 \times 5{,}5\% = 1{,}0\%$
c. R risky assets and cash (of 3ES) = 0,5 × 12% + 0,5 × 1,0% = 6,5%
   R risky assets and cash (of 3ES) = 0,2 × 1% + 0,8 × Ra risky assets = 6,5% →
   Ra risky assets =(6,5% - 0,2%) / 0,8 = 7,875%

   Or
   Ra risky assets = (0,3 × 1,0% + 0,5 × 12%) / 0,8 = 7,875%

   Or
   Beta risky assets = (0,3 × 0 + 0,5 × 2) / 0,8 = 1,25
   R risky assets = 1% + 1,25 × 5,5% = 7,875%