UNIVERSITY OF AGDER
SCHOOL OF BUSINESS AND LAW

EXAM

Course code:	**BE 410**
Course name:	**Corporate Finance**
Date:	2 October, 2015
Duration:	09.00 – 13.00
Pages:	12 pages in total, including a 6 page attachment with useful formulas and numerical table of the cumulative standard normal distribution.
Allowed aid:	Calculator with empty memory, dictionary
Note:	You can answer in English or Norwegian

Exercise 1 (30%)

15 questions in total. Correct answer is 1 point, wrong answer is 0 point. Also 0 points if you pick more than one answer. If you do not like any of the alternatives, give a brief explanation why this is so. Make a two-column table with the question number in the left column, and the answer in the right. You can present calculations/comments below the table if this is preferred (but not necessary).

1) Which of the following statements is FALSE?
   A) The more cash the firm uses to repurchase shares, the less it has available to pay dividends.
   B) Free cash flow measures the cash generated by the firm after payments to debt or equity holders are considered.
   C) We estimate a firm's current enterprise value by computing the present value of the firm's free cash flow.
   D) We can interpret the enterprise value as the net cost of acquiring the firm's equity, taking its cash and paying off all debts.

2) You expect KT Industries (KTI) will have earnings per share of $3 this year and expect that they will pay out $1.50 of these earnings to shareholders in the form of a dividend. KTI's return on new investments is 15% and their equity cost of capital is 12%. The value of a share of KTI's stock is closest to:
   A) $39.25
   B) $20.00
   C) $33.35
   D) $12.50

3) Suppose that Google Stock has a beta of 1.06 and Boeing stock has a beta of 1.31. If the risk-free interest rate is 4% and the expected return from the market portfolio is 12%, then the expected return on a portfolio that consists of 30% Google stock and 70% Boeing stock is closest to:
   A) 12.5%
   B) 13.1%
   C) 13.5%
   D) 13.9%

4) Which of the following is true of asset betas?
   A) Asset betas are expected to vary greatly within firms in the same industry.
   B) Businesses that are less sensitive to market and economic conditions tend to have higher asset betas than more cyclical industries.
   C) Businesses that are less sensitive to market and economic conditions tend to have lower asset betas than more cyclical industries.
   D) A and B are correct.

5) Which of the following influences a firm's choice of capital structure?
A) Taxes
B) Agency costs and benefits of leverage
C) Signaling and adverse selection
D) All of the above influence capital structure decisions.

Use the information below to answer questions 6, 7 and 8:
Monsters Incorporated (MI) is ready to launch a new product. Depending upon the success of this product, MI will have a value of $100 million, $150 million, or $191 million next year, with each outcome being equally likely. The cash flows are unrelated to the state of the economy (i.e. risk from the project is diversifiable) so that the project has a beta of 0 and a cost of equity capital and debt capital equal to the risk-free rate, which is currently 5%. Assume perfect capital markets.

6) The initial value of MI's equity without leverage is closest to:
A) $133 million
B) $147 million
C) $140 million
D) $150 million

7) Suppose that MI has zero-coupon debt with a $125 million face value due next year. The initial value of MI's debt is closest to:
A) $125 million
B) $111 million
C) $100 million
D) $116 million

8) Suppose that MI has zero-coupon debt with a $125 million face value due next year. The initial value of MI's equity with leverage is closest to:
A) $30 million
B) $15 million
C) $29 million
D) $24 million

9) Luther Industries currently has 5 million shares outstanding and it stock is currently trading at $40 per share. Assume perfect capital markets. If Luther issues a 5:2 stock split, then Luther's new share price is closest to:
A) $32.00
B) $16.00
C) $24.00
A) $30.00

10) Schwartz Industries currently has 100 million shares of stock outstanding at a price of $25 per share. The company would like to raise money and has announced a rights issue. Every existing shareholder will be sent one right per share of stock that he or she owns. The company plans to require twenty rights to purchase one share at a price of $20 per share. The amount of money that Schwartz Industries will raise through its rights offering is closest to:

A) $500 million
B) $125 million
C) $100 million
D) $400 million

11) Berk Industries is currently trading for $27 per share. The stock pays no dividends. A one-year European put option on Berk Industries with a strike price of $30 is currently trading for $2.60. If the risk-free interest rate is 6% per year, then the price of a one-year European call option on Berk Industries with a strike price of $30 will be closest to:

A) $1.30
B) $7.10
C) $2.60
D) $1.95

12) The current price of KD Industries stock is $20. In the next year the stock price will either go up by 20% or go down by 20%. KD pays no dividends. The one year risk-free rate is 5% and will remain constant. Using the binomial pricing model, the calculated price of a one-year call option on KD stock with a strike price of $20 is closest to:

A) $2.40
B) $2.00
C) $2.15
D) $1.45

13) You own a convertible bond with a face value of $1,000 and a conversion ratio of 45. The conversion price is closest to:

A) $18
B) $22
C) $45
D) $1,000

14) A rights offering that gives existing target shareholders the right to buy shares in either the target or the acquirer at a deeply discounted price once certain conditions are met is called a:

A) golden parachute.
B) poison pill.
C) classified board.
D) white knight.

15) Taggart Transcontinental and Phoenix-Durango have entered into a stock swap merger agreement whereby Taggart will pay a 30% premium over Phoenix-Durango's premerger price. If Taggart's premerger price per share was $15 and Phoenix-Durango's was $30, then the exchange ratio that Taggart will offer is closest to:

A) 0.4
B) 1.8
C) 2.0
D) 2.6

Exercise 2 (10%)

Grummon Corporation has issued zero-coupon corporate bonds with a five-year maturity, each with $100 face value. Investors believe there is a 20% chance that Grummon will default on these bonds. If Grummon does default, investors expect to receive only 50 cents per dollar they are owed.

a) If investors require a 6% expected return on their investment in these bonds, what will be the price and yield to maturity on these bonds?
b) Explain briefly why the expected return on of a corporate bond is typically lower than its yield to maturity?

Exercise 3 (15%)

Your wealth is $200,000 and you are eager to invest. You choose to borrow $200,000 in addition to your current wealth, and invest all $400,000 in the market portfolio.

a) If the risk-free interest rate is 5% and the expected return on the market portfolio is 10%, what is the expected return of your investment?
b) If the volatility of the market portfolio is 15%, what is the volatility of your investment?
c) What is the Sharpe ratio for the market portfolio? What is the Sharpe ratio for your investment? Explain briefly your results.

Exercise 4 (20%)

Kurz Manufacturing is currently an all-equity firm with 20 million shares outstanding and a stock price of $7.50 per share. Although investors currently expect Kurz to remain an all-equity firm, Kurz plans to announce that it will borrow $50 million and use the funds to repurchase shares. Kurz will pay interest only on this debt, and it has no further plans to increase or decrease the amount of debt. Kurz is subject to a 40% corporate tax rate.

a) What is the market value of Kurz's existing assets before the announcement?
b) What is the market value of Kurz's assets (including any tax shields) just after the debt is issued, but before the shares are repurchased?
c) What is Kurz's share price just before the share repurchase? How many shares will Kurz repurchase?
d) What are Kurz's market value balance sheet and share price after the share repurchase?

Exercise 5 (25%)

You are a consultant who was hired to evaluate a new product line for Markum Enterprises. The upfront investment required to launch the product line is $10 million. The product will generate free cash flow of $750,000 the first year, and this free cash flow is expected to grow at a rate of 4% per year. Markum has an equity cost of capital of 11.3%, a debt cost of capital of 5%, and a tax rate of 35%. Markum maintains a debt-equity ratio of 0.40.

a) What is the NPV of the new product line (including any tax shields from leverage)?
b) How much debt will Markum initially take on as a result of launching this product line?
c) How much of the product line's value is attributable to the present value of interest tax shields?

BE-410 Exam enclosure: Formula sheet

The Time Value of Money.

$$PV(C_n) = \frac{C_n}{(1+r)^n} \qquad FV_n(C) = C \times (1+r)^n$$

$$PV(\text{Stream of Cash Flow}) = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n} \qquad PV(\text{perpetuity}) = \frac{C}{r}$$

$$PV(\text{annuity}) = C \times \frac{1}{r}\left(1 - \frac{1}{(1+r)^N}\right) \qquad FV(\text{annuity}) = C \times \frac{1}{r}\left((1+r)^N - 1\right)$$

$$PV(\text{growing perpetuity}) = \frac{C}{r-g} \qquad PV(\text{growing annuity}) = C \times \frac{1}{r-g}\left(1 - \left(\frac{1+g}{1+r}\right)^N\right)$$

$$C = \frac{P}{\frac{1}{r}\left(1 - \frac{1}{(1+r)^N}\right)}$$

$$IRR \text{ with two cash flows} = \left(\frac{FV}{P}\right)^{\frac{1}{N}} - 1 \qquad IRR \text{ of growing perpetuity} = \frac{C}{P} + g$$

Interest Rates.

$$1 + EAR = \left(1 + \frac{APR}{k}\right)^k \qquad r_r = \frac{r-i}{1+i} \approx r - i$$

$$PV = \frac{C_1}{1+r_1} + \frac{C_2}{(1+r_2)^2} + \ldots + \frac{C_N}{(1+r_N)^N} = \sum_{n=1}^{N} \frac{C_n}{(1+r_n)^n}$$

Valuing Bonds.

$$CPN = \frac{\text{Coupon Rate} \times \text{Face Value}}{\text{Number of Coupon Payments per Year}} \qquad YTM_n = \left(\frac{FV}{P}\right)^{\frac{1}{n}} - 1$$

$$P = CPN \times \frac{1}{y}\left(1 - \frac{1}{(1+y)^N}\right) + \frac{FV}{(1+y)^N}$$

$$PV(\text{Bond Cash Flow}) = \frac{CPN}{1+YTM_1} + \frac{CPN}{(1+YTM_2)^2} + \ldots + \frac{CPN+FV}{(1+YTM_n)^n}$$

Valuing Stocks.

$$r_E = \frac{Div_1 + P_1}{P_0} - 1 = \underbrace{\frac{Div_1}{P_0}}_{\text{Dividend yield}} + \underbrace{\frac{P_1 - P_0}{P_0}}_{\text{Capital Gain Rate}}$$

$$P_0 = \frac{Div_1}{1+r_E} + \frac{Div_2}{(1+r_E)^2} + \ldots + \frac{Div_N}{(1+r_E)^N} + \frac{P_N}{(1+r_E)^N} \qquad P_0 = \frac{Div_1}{r_E - g}$$

$$Div_t = \underbrace{\frac{\text{Earnings}_t}{\text{Shares Outstanding}_t}}_{EPS_t} \times \text{Dividend Payout Rate}_t$$

$$g = \text{Retention Rate} \times \text{Return on New Investment}$$

$$P_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0}$$

$$\text{Free Cash Flow} = EBIT \times (1-\tau_c) - \text{Net Investment} - \text{Increases in Net Working Capital}$$

$$\text{Net Investment} = \text{Capital Expenditures - Depreciation}$$

$$V_0 = PV(\text{Future Free Cash Flow of Firm}) \qquad P_0 = \frac{V_0 + \text{Cash}_0 - \text{Debt}_0}{\text{Shares Outstanding}_0}$$

Capital Markets and the Pricing of Risk.

$$E[R] = \sum_R p_R \times R$$

$$Var(R) = E\left[(R - E[R])^2\right] = \sum_R p_R \times (R - E[R])^2 \qquad SD(R) = \sqrt{Var(R)}$$

$$SD(\text{Average of Independent, Identical Risks}) = \frac{SD(\text{Individual Risk})}{\sqrt{\text{Number of Observations}}}$$

$$\text{Market Risk Premium} = E[R_{Mkt}] - r_f$$

$$r_i = r_f + \beta_i \times (E[R_{Mkt}] - r_f)$$

Properties of Expectations, Variances, and Covariances. X, Y, and Z are random variables; a, b, and c are constants.

$$E[X+Y] = E[X] + E[Y] \qquad E[aX+bY+c] = aE[X] + bE[Y] + c$$

$$Var(X+a) = Var(X) \qquad Var(X+Y) = Var(X) + Var(Y) + 2Cov(X,Y)$$

$$Var(aX) = a^2 Var(X) \qquad Var(aX+bY+c) = a^2 Var(X) + b^2 Var(Y) + 2abCov(X,Y)$$

$$Cov(a,X) = 0 \qquad Cov(X+Y,Z) = Cov(X,Z) + Cov(Y,Z)$$

$$Cov(X,X) = Var(X) \qquad Cov(aX+bY+c,Z) = aCov(X,Z) + bCov(Y,Z)$$

Optimal Portfolio Choice and the Capital Asset Pricing Model.

$$x_i = \frac{\text{Value of investment } i}{\text{Total value of portfolio}} \qquad E[R_p] = \sum_i x_i E[R_i]$$

$$Cov(R_i,R_j) = E\left[(R_i - E[R_i])(R_j - E[R_j])\right] \qquad Corr(R_i,R_j) = \frac{Cov(R_i,R_j)}{SD(R_i)SD(R_j)}$$

$$\begin{aligned} Var(R_p) &= Var(x_1R_1 + x_2R_2) = x_1^2 Var(R_1) + x_2^2 Var(R_2) + 2x_1x_2Cov(R_1,R_2) \\ &= x_1^2 SD(R_1)^2 + x_2^2 SD(R_2)^2 + 2x_1x_2Corr(R_1,R_2)SD(R_1)SD(R_2) \end{aligned}$$

$$\begin{aligned} Var(R_p) = \frac{1}{n}&(\text{Average Variance of the Individual Stocks}) \\ &+ \left(1 - \frac{1}{n}\right)(\text{Average Covariance between the Stocks}) \end{aligned}$$

$$SD(R_p) = \sum_i \underbrace{x_i \times SD(R_i) \times Corr(R_i,R_p)}_{\text{Security } i\text{'s contribution to the port. volatility}}$$

$$E[R_{xP}] = r_f + x\left(E[R_p] - r_f\right) \qquad SD(R_{xP}) = xSD(R_p)$$

$$\text{Sharpe Ratio} = \frac{\text{Portfolio Excess Return}}{\text{Portfolio Volatility}} = \frac{E[R_p] - r_f}{SD(R_p)} \qquad \beta_i^P = \frac{SD(R_i) \times Corr(R_i,R_p)}{SD(R_p)}$$

$$r_i = r_f + \beta_i^P \times (E[R_p] - r_f) \qquad E[R_i] = r_i = r_f + \beta_i^{eff} \times (E[R_{eff}] - r_f)$$

$$E[R_i] = r_i = r_f + \underbrace{\beta_i \times (E[R_{Mkt}] - r_f)}_{\text{Risk premium for security } i}$$

$$\beta_i = \frac{\overbrace{SD(R_i) \times Corr(R_i,R_{Mkt})}^{\text{Volatility of } i\text{that is common with the market}}}{SD(R_{Mkt})} = \frac{Cov(R_i,R_{Mkt})}{Var(R_{Mkt})} \qquad \beta_p = \sum_i x_i\beta_i$$

Estimating the Cost of Capital.

$$r_d = \text{Yield to Maturity - Prob(default)} \times \text{Expected Loss Rate}$$

$$r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D \qquad \beta_U = \frac{E}{E+D}\beta_E + \frac{D}{E+D}\beta_D$$

Capital Structure in a Perfect Market.

$$r_E = r_U + \frac{D}{E}(r_U - r_D) \qquad \beta_E = \beta_U + \frac{D}{E}(\beta_U - \beta_D)$$

$$r_{wacc} = r_A = r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D \qquad \beta_U = \frac{E}{E+D}\beta_E + \frac{D}{E+D}\beta_D$$

Debt and Taxes.

$$V^L = V^U + PV(\text{Interest Tax Shield})$$

$$PV(\text{Interest Tax Shield}) = \tau_c \times D$$

$$r_{wacc} = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D(1-\tau_c) = \underbrace{\frac{E}{E+D} r_E + \frac{D}{E+D} r_D}_{\text{Pretax WACC}} - \underbrace{\frac{D}{E+D} r_D \tau_c}_{\text{Reduction due Tax Shield}}$$

Capital Budgeting and Valuation with Leverage.

$$r_{wacc} = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D(1-\tau_c)$$

Debt capacity $D_t = \frac{D}{E+D} V_t^L = d \times V_t^L \qquad V^L = APV = V^U + PV(\text{Interest Tax Shield})$

$$r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D = \text{ Pretax WACC}$$

$$FCFE = FCF - (1-\tau_c) \times (\text{Interest Payments}) + (\text{Net Borrowing})$$

$$r_E = r_U + \frac{D}{E}(r_U - r_D) \qquad r_{wacc} = r_U - \frac{D}{E+D}\tau_c r_D = r_U - d\tau_c r_D$$

Financial Options.

$$C = \max(S-K, 0) \qquad P = \max(K-S, 0)$$

$$C = P + S - PV(K) - PV(Div)$$

$$C = \underbrace{S-K}_{\text{Intrinsic value}} + \underbrace{dis(K) + P - PV(Div)}_{\text{Time value}} \qquad P = \underbrace{K-S}_{\text{Intrinsic value}} + \underbrace{C - dis(K) + PV(Div)}_{\text{Time value}}$$

Option Valuation.

$$C = S\Delta + B \qquad \Delta = \frac{C_u - C_d}{S_u - S_d} \qquad B = \frac{C_d - S_d\Delta}{1 + r_f}$$

$$C = S \times N(d_1) - PV(K) \times N(d_2)$$

$$d_1 = \frac{\ln\left[\frac{S}{PV(K)}\right]}{\sigma\sqrt{T}} + \frac{\sigma\sqrt{T}}{2} \qquad d_2 = d_1 - \sigma\sqrt{T}$$

$$P = PV(K)[1 - N(d_2)] - S[1 - N(d_1)]$$

$$S^x = S - PV(Div) \qquad S^x = \frac{S}{1+q}$$

for a call option $\Delta = N(d_1)$ and $B = -PV(K) \times N(d_2)$

for a put option $\Delta = -[1 - N(d_1)]$ and $B = PV(K)[1 - N(d_2)]$

Table of cumulative standard normal distribution

The table shows values of $N(x)$ for $x \geq 0$. When $x < 0$ use the following property: $N(-x) = 1 - N(x)$.

x	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5754
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7258	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7518	0.7549
0.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7996	0.8023	0.8051	0.8079	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9430	0.9441
1.6	0.9452	0.9463	0.9474	0.9485	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9700	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9762	0.9767
2.0	0.9773	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9865	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9980	0.9980	0.9981
2.9	0.9981	0.9982	0.9983	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.9	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
4.0	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999