EXAMINATION I

Economics

Corporate Finance

Financial Accounting and Financial Statement Analysis

Equity Valuation and Analysis

Questions

Final examination

September 2019

Question 1: **Economics** **(39 points)**

Growth momentum in Russia increased in the first half of 2018. However, demand growth appears to have weakened in the third quarter of 2018. As for the near future, the World Bank baseline scenario (November 2018) expects Russia's potential growth to continue its gradual downward trend from 1.5 percent in 2017 to bottoming out at 1.3 percent in 2022.

To increase growth, in May 2018 the Russian President, Vladimir Putin, issued the "May Decree" which, starting in 2019, pushes the government's policy in the direction of increasing expenditure on education, health, infrastructures, social policy, digital economy, and on the support of small and medium enterprises and of exports. The additional spending in these areas is expected to be about 8 trillion Rubles over six years (or about 1.1 percent of annual GDP, on average). Although increases in VAT, and in the taxation of the oil sector, and in the retirement age, are planned, the net increase in the fiscal stance will be in the order of 0.5% per year, a remarkable expansion.

a) Focus on the short-run effects of the net increase in public expenditure, considering Russia as a closed economy. By using the IS-LM framework and diagram, briefly explain the IS curve, and then show how it is affected by an increase in public expenditure. (6 points)

In September 2018 the Central Bank raised the policy rate from 7.25 percent to 7.5 percent. This restriction in the monetary policy has been ascribed both to "elevated inflationary risks" and to the desire to contrast the Ruble depreciation (the Dollar appreciation) caused by geopolitical tensions and the general turbulence in emerging markets.

b) First describe, also by means of a diagram, the money market equilibrium. Then explain how the Russian Central Bank can increase the interest rate and affect output (for a given IS schedule) by using the IS-LM framework and diagram. (11 points)

c) The hypothesis AS-AD model is now supposed to represent the general equilibrium of the Russian economy.

   c1) Briefly present the AS-AD model by means of a diagram. Also explain the both slope's signs of AD and AS curves. (6 points)

   c2) Under the AS-AD model, clarify the "inflationary risk" showing how the expansionary fiscal policy may create a pressure on prices (you can also use a graphic to support your answer). Briefly discuss the effects of the Russian Central Bank policy. (5 points)

d) Explain the "uncovered interest rate parity" and exploit it to assess the effects of an increase in the interest rate on the nominal exchange rate. (5 points)

Russia is an important supplier of "energy products". In October 2018, oil production reached an all-time high of 11.4 mb/d; extraction of natural gas reached a record high of 640 billion cubic meters in 2017, making Russia the second-largest producer after the United States. Russia exports a large share of its production, and oil and gas products reached about 59 percent of total export of goods in 2017. Oil prices averaged USD 70 per barrel in 2018 (up 33 percent from their 2017 average), but prices fell sharply in early November after an improvement of the relations between U.S. and Iran. This combined with an upward revision to production in the U.S., and increased production by both OPEC members and their allies, is causing concerns about a price decline.

e) Assume a price decline of oil (both in Dollar and Ruble terms) and assume that the demand for energy product is rigid. Describe the likely consequences for Russian GDP of a low oil price. (6 points)

Question 2: Corporate Finance and Equity Valuation and Analysis (46 points)

a) What is the impact of an increase of each of the following items (see Table 1) by EUR 100 million on company Paragon SE's free cash flow to the firm (FCFF) and free cash flow to equity (FCFE) in the year under review? Complete Table 1 assuming Paragon SE's corporate tax rate is 30%.
[Note: Calculate the figures in the blanks independently, given increase of each item.]
(11 points)

Table 1 Impact on Paragon SE's FCFF and FCFE
(Unit: EUR million)

Item to be increased	**Change of FCFF**	**Change of FCFE**
Net income	+100	.....
Cash expenses from operations	.....	-70
Depreciation	+30	.....
Interest expenses	0	.....
EBIT	.....	+70
Accounts receivable	.....	-100
Accounts payable	+100	.....
Intangible assets	-100	.....
Dividends paid	0	.....
Proceeds from a capital increase	.....	0
Share buyback	.....	0

b) You are a financial analyst and have been asked by your team head to provide an investment recommendation (buy, neutral, or sell) on automotive supplier Smalt AG whose shares are publicly traded on the Frankfurt Stock Exchange. At yesterday's close Smalt AG's share price was EUR 8.00.

During its most recently closed last financial year, Smalt AG generated a free cash flow to the firm (FCFF) of EUR 170 million and a free cash flow to equity (FCFE) of EUR 130 million. The group's weighted average cost of capital (WACC) is expected to be 11.0%, required cost of equity is 13.0%. Terminal growth rates of FCFF and FCFE are expected to be 2.5% and 3.0%, respectively. The market value of Smalt AG's outstanding debt is EUR 710 million. Smalt AG has 200 million shares issued and outstanding.

b1) Using the Gordon constant growth model, what is your price target and investment recommendation for Smalt's shares using the FCFF valuation approach? Please justify your answer. (4 points)

b2) Using the Gordon constant growth model, what is your price target and investment recommendation for Smalt's shares using the FCFE valuation approach? Please justify your answer. (3 points)

c) You collected the following information about Cannamark plc, a leading Canadian cannabis manufacturer:

- In the current fiscal year (year 0), Cannamark is expected to generate net income of CAD 25 million. Depreciation is expected to be CAD 18 million, gross investments in tangible assets will be CAD 26 million, and net working capital is supposed to increase by CAD 4 million.

- In the next three years (from year 1 to year 3), Cannamark's free cash flows to the firm (FCFF) are expected to grow by 8.0% per year.

- After year 4, FCFF is expected to grow in perpetuity at 6.0% per year.

- Cannamark is financed with 40% debt and 60% equity. The company expects to keep its current capital structure and finance 40% of its future net investments and its working capital with debt financing, and 60% with equity financing.

- Two years ago, Cannamark issued a bond with a notional value of CAD 250 million. Today, the bond is currently trading at 80.0% of its par value. Annual interest expenses on the bond are CAD 15 million. Cannamark has no other interest-bearing debts.

- The Canadian corporate tax rate is 30%.

- Cost of debt is 7.0%, cost of equity is 11.0% (both pre-tax).

- Cannamark has 21.5 million shares issued and outstanding.

Calculate the total value of the firm, the market value of equity and the equity value per share using a two-stage FCFF valuation approach with stage 1 comprising the current and the next three years, followed after 4 years by stage 2 with FCFF growth of 6.0% p.a. forever. Assume that you perform the valuation at the beginning of Cannamark's current fiscal year. Would you buy the shares if they were trading at CAD 28.50? (20 points)

d) SE SensorialExperiences manufactures and markets flavours and fragrances from natural and synthetic ingredients. SE is the global leader in the Flavours & Fragrances industry with approximately 25% of their industry's global market share.

The flavours & fragrances market has very resilient, if unspectacular, growth rates (2-3% on average). SE expects to outgrow the market in the coming years thanks to increased exposure to emerging markets, market share gains (from smaller, local players) and high growth in new Health & Wellness subsegments.

SE's shares have been listed on Betterland's stock exchange for many years. The shares are currently traded at a price/earnings multiple of 33.1x (based on recently published last year's net earnings per share).

d1) What is SE's cost of equity (k_E) implied by the current price/earnings multiple of SE's share? Use the Gordon Growth Model and the information in Table 2 below for your calculation. (4 points)

Table 2 Information to SE SensorialExperiences dividends

Dividend payout ratio over the last 5 financial years (average)	70% of earnings
Dividend growth rate over the last 5 years	4.0% p.a.

d2) You base your investment decisions on long-term data and have therefore looked for some additional data about Betterland's capital markets in general and SE's share in particular. Please see Table 3 below. Assuming the CAPM holds, what is SE's cost of equity (k_E) implied by these long-term data? Would you buy SE's stock? (4 points)

Table 3 Betterland Capital Markets over the last 80 years 1939 – 2018

Stock market return, annualized	8.05% p.a.
Risk free return, annualized	4.12% p.a.
Stock market risk premium	3.93% p.a.

SE SensorialExperiences	
Equity beta	0.86

Question 3: Financial Accounting and Financial Statement Analysis (26 points)

In the interim report as of June 30, 2018, Bayer AG, a leading company in the seeds and traits industry, informed about the acquisition of the U.S. agriculture company Monsanto as follows:

"Bayer acquired 100% of the outstanding shares of Monsanto Company, St. Louis, Missouri, United States on June 7, 2018. The purchase price of EUR 48,029 million pertained mainly to intangible assets […] property, plant and equipment, inventories and goodwill."

With the takeover, Bayer has acquired the following assets and liabilities (preliminary values excluding goodwill, in million Euro).

Other intangible assets	27,060
Property, plant and equipment, other long-term assets	8,143
Short-term assets excluding Cash and Cash equivalents	12,110
Cash and Cash equivalents	2,657
Total assets	**49,970**
Provisions	1,896
Financial liabilities	8,656
Deferred Taxes*	8,019
Other liabilities	6,368
Total liabilities	**24,939**

* including those resulting from the valuation of Monsanto's identifiable net assets at fair value

a) Calculate the goodwill deriving from the acquisition of Monsanto based on the preliminary values of the acquired assets and liabilities (with calculation using the acquisition method). (4 points)

Goodwill (preliminary value)

b) The stated fair values of the acquired assets and assumed liabilities can still change, since the valuation could not be completed until the financial statements were prepared. Therefore, the fair values have only been determined provisionally.

Let's assume, the final fair values of the acquired other intangible assets are EUR 2,000 million higher than the amounts calculated provisionally in the purchase price allocation, while the purchase price of EUR 48,029 million is unchanged. How would the adjustment affect the consolidated statement of financial position of Bayer?

Consider the impact on the value of the assets acquired and liabilities assumed including goodwill and deferred taxes. The tax rate for Monsanto is assumed to be 30%. Indicate in the table below how the previous amounts would be modified (enter changes in million Euro). (4 points)

Adjustment of the purchase price allocation	Change in million EUR
Goodwill	.....
Other intangible assets	.....
Property, plant and equipment, other long-term assets	.....
Short-term assets excluding Cash and Cash equivalents	.....
Cash and Cash equivalents	.....
Total assets	.....
Provisions	.....
Financial liabilities	.....
Deferred Taxes	.....
Other liabilities	.....
Total liabilities	.....

c) How would it have affected the initial consolidation of Monsanto, if Bayer – compared to the actual situation – had acquired only 75% of the shares of Monsanto at a purchase price of EUR 36,022 million (75% of EUR 48,029 million)?

Suppose that non-controlling interests are measured at their share in the recognised amounts of the acquiree's identifiable net assets (partial goodwill method). Indicate in the table below how Bayer's consolidated statement of financial position in case of the 100% acquisition would be modified (enter changes in million Euro).

(6 points)

Changes assuming an acquisition of 75% of the shares of Monsanto in million EUR	
Cash and Cash equivalents (48,029 – 36,022)	+12,007
Non-controlling interests	.....
Goodwill	.....

d) How does the answer to question c) change if Bayer applied the full goodwill method? Assume that the purchase price for 75% of the shares of Monsanto corresponds to the proportionate market capitalization of Monsanto at the acquisition date. Indicate in the table below how Bayer's consolidated statement of financial position would be modified (enter changes in million Euro). (4 points)

Changes when using the full goodwill method in million EUR	
Cash and Cash equivalents (48,029 – 36,022)	+12,007
Non-controlling interests	.....

e) What was the impact of the acquisition of Monsanto (as described in question a) above) on the statement of cash flows of Bayer? Assume that in order to fund the agreed purchase price for the acquisition of 100% of the shares of Monsanto in cash (48,029 million Euro), Bayer issued bonds with a total volume of 25,000 million Euro and sold non-current assets at a price of 10,000 million Euro against a cash consideration. (8 points)

Impact of the acquisition on Bayer's statement of cash flows in million EUR	
Cash flow from operating activities	.....
……	.....
……	.....
Cash flow from investing activities	.....
……	.....
Cash flow from financing activities	.....
Change in cash and cash equivalents	.....
Cash and cash equivalents as of January 01	13,000
Cash and cash equivalents as of June 30	.....

Question 4: Corporate Finance and Equity Valuation and Analysis (42 points)

At the very beginning of business year T+1, Company ABC is considering the acquisition of Company Timber. Both companies are active in the same industry. Table 1 below shows Company Timber's balance sheet as at the end of the business year T. Table 2 shows the financial projections (e.g. sales, capital expenditure, change in net working capital) for Company Timber for the business years T+1 till T+3 under the assumption that Company Timber continues to operate its business independently (standalone basis).

Table 1 Company Timber: Balance sheet as per end of business year T
(Unit: EUR million)

Cash and cash equivalents	15	Accounts payable	90
Accounts receivable	110	Short-term borrowings	30
Inventories	95	Current liabilities	120
Current assets	220	Bonds	130
Property, plant and equipment	350	Deferred tax liabilities	70
Other non-current assets	50	Shareholders' equity	300
Total	620	Total	620

Table 2 Company Timber: Financial projections for the business years T+1 till T+3
(Unit: EUR million)

Business year	**T+1**	**T+2**	**T+3**
Sales	600	675	750
Operating expenses (excluding depreciation)	480	540	620
Depreciation	65	75	80
Operating income	55	60	50
Interest expenses	20	22	24
Pre-tax profit	35	38	26
Corporate tax etc. (tax rate 40%)	14	15.2	10.4
After-tax profit	21	22.8	15.6
Capital expenditure	75	82	81
Change in net working capital	13	15	14

a) At the beginning of business year T+1: (1) the risk-free interest rate is 2% p.a.; (2) the market risk premium is 5%; and (3) Company Timber's equity beta is 0.8. On the basis of the Capital Asset Pricing Model (CAPM), what is Company Timber's cost of equity? (2 points)

b) At the end of business year T, Company Timber's share price had a Price to Book Ratio (P/B Ratio) of 1.20. Company Timber's borrowing rate for short-term borrowings is 2.5% p.a., it very recently issued a 7-year straight bond with a principal amount of EUR 130 million and a fixed coupon rate of 3.0% p.a.

The book values and market values are equal for both type of debt (short-term borrowings and the outstanding bond). The balance of cash and cash equivalents at the end of business year T does not include surplus cash and cash equivalents, and therefore the balance of cash and cash equivalents must not be deducted when calculating the net balance of interest-bearing liabilities. The corporate income tax rate is 40%. On the basis of Company Timber's capital structure as per the end of business year T, what is Company Timber's after-tax weighted average cost of capital (WACC)? (5 points)

c) Calculate Company Timber's free cash flow to the firm (FCFF) for each of the 3 years from T+1 to T+3. (9 points)

d) At the beginning of business year T+1, Company Timber had 30 million shares issued and outstanding. On a standalone basis, Company Timber's FCFF is expected to grow at an annualized rate of 2.0% from business year T+4 onwards. Based on these assumptions, what is the theoretical price in EUR of Company Timber's shares at the beginning of business year T+1? Use the discounted free cash flow method for your calculations. Use a WACC of 4.75% instead of the result calculated in question b). (6 points)

e) Company ABC's finance department has calculated a theoretical price for Company Timber's share (on a standalone basis) of EUR 12.00 (which exactly equals the current stock market price of Timber), and they estimate that the acquisition of Company Timber will create synergies with a present value of EUR 180 million. What is the maximum price Company ABC should pay per share of Company Timber based on the above data and estimates?
[Note: In such case, the entire value of synergies goes to the shareholders of Company Timber.] (3 points)

f) Company ABC has decided to launch a takeover bid of EUR 450 million for all issued and outstanding shares of Company Timber, splitting synergies equally between shareholders of Company ABC and Timber. Furthermore, Company ABC intends to pay with newly issued shares rather than with cash.

If the acquisition were to take the form of a share swap rather than a cash acquisition, how many shares in Company ABC should be exchanged for 1 share in Company Timber for the share swap to be economically equivalent to a cash acquisition in the amount of EUR 450 million? Assume, that: (1) Company ABC currently has 80 million shares issued and outstanding; (2) Company ABC's share price before the market learns of the acquisition is EUR 25; and (3) taxes and transaction costs can be ignored. (10 points)

g) After announcing the take-over bid for Company Timber as well as ABC's capital increase to finance the acquisition, ABC's management is talking with investors of both companies. During the discussions with investors, the management makes clear that the synergies of an estimated amount of EUR 180 million arise entirely from sustainable savings of operating expenses of EUR 15 million p.a., starting already in year T+1. Do you believe ABC's estimates of the cost savings and the synergies are reasonable? Substantiate your answer with numbers. Base your answer on the following information: (1) The combined firm's WACC is 4.75%; and (2) its tax rate is 40%. (7 points)

Question 5: Financial Accounting and Financial Statement Analysis (27 points)

HydroGenium SE is a global, dedicated hydrogen company, delivering optimal solutions to produce, store and distribute hydrogen. 1Proton S.A. is the largest manufacturer of hydrogen generators across the globe. Both companies prepare their financial statements in accordance with International Financial Reporting Standards (IFRS) and close their accounts as at the same reporting date. Both companies are taxed at a rate of 30%.

As at the first day of the 2nd half of the current financial year T, HydroGenium has acquired all issued shares of 1Proton for an aggregate consideration of EUR 320 million in cash, half of this amount being financed by a 5-year bank loan.

Henry Cavendish, CFO of HydroGenium SE, is currently preparing the combined group's opening consolidated statement of financial position as at the day after the closing date of the business combination.

HydroGenium's and 1Proton's statements of financial position as at the end of the 1st half of the current financial year T (i.e. on the day before closing the business combination) are shown in Appendices 1 and 2.

Henry Cavendish knows that according to IFRS 3 a business combination must be accounted for by applying the acquisition method. And, applying this method requires (among other things):
Recognizing and measuring the identifiable assets acquired and the liabilities assumed at their acquisition-date fair values; and recognizing and measuring goodwill.

According to IFRS 3 the acquirer shall recognize goodwill as of the acquisition date measured as the excess of the aggregate of the consideration transferred over the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed.

The recognition and measurement of the identifiable assets acquired and the liabilities assumed has produced – based on the assumptions and judgements of HydroGenium's management and a review by an independent third party – the results (changes to the carrying values as at the end of the first half of financial year T) presented in Appendix 3.

a) Allocate the consideration transferred (i.e. the purchase price) to the identified assets acquired and the liabilities assumed, both measured at the acquisition-date fair values; and determine goodwill. Fill in the blank boxes in the table shown in Appendix 4. (13 points)

b) Prepare the combined group's consolidated statement of financial position as at the beginning of the 2nd half of financial year T. Fill in the blank boxes in the table shown in Appendix 5. (14 points)

Appendix 1

HydroGenium SE

Statement of financial position as at the end of the 1st half of financial year T	**in EUR million**
Assets	
Property, plant and equipment	150
Other assets	115
Intangible assets	60
Goodwill	90
Non-current assets	**415**
Inventories	110
Contract assets	55
Trade and other receivables	125
Cash and cash equivalents	260
Current assets	**550**
Total assets	**965**
Liabilities	
Borrowings	150
Provisions	35
Other liabilities	40
Deferred tax liabilities	50
Non-current liabilities	**275**
Trade and other payables	160
Other current liabilities	115
Contract liabilities	35
Current liabilities	**310**
Total equity	**380**
Total equity and liabilities	**965**

Appendix 2

1Proton S.A.

Statement of financial position as at the end of the 1st half of financial year T	**in EUR million**
Assets	
Property, plant and equipment	60
Other assets	45
Non-current assets	**105**
Inventories	45
Contract assets	20
Trade and other receivables	55
Cash and cash equivalents	10
Current assets	**130**
Total assets	**235**
Liabilities	
Borrowings	50
Provisions	15
Other liabilities	15
Non-current liabilities	**80**
Trade and other payables	50
Other current liabilities	40
Contract liabilities	20
Current liabilities	**110**
Total equity	**45**
Total equity and liabilities	**235**

Appendix 3

1Proton S.A.

Adjustment for Fair value measurement of assets acquired and liabilities assumed as at the acquisition date	**in EUR million**
Tangible assets:	
Revaluation of Property, plant and equipment	15
Revaluation of Inventories	10
Revaluation of Contract assets	5
Intangible Assets:	
Customer relationships	15
Technology	75
Patents	30

The fair value of 1Proton's all other assets and liabilities is equal to their carrying value as at the end of 1st half of financial year T.

Appendix 4

Allocation of the consideration transferred

in EUR million	Carrying value	Adjustment	Fair value
Consideration transferred (purchase price)			320
Identified assets acquired			
Property, plant and equipment	60		
Other assets	45	0	45
Intangible assets	0		
Inventories	45		
Contract assets	20		
Trade and other receivables	55	0	55
Cash and cash equivalents	10	0	10
Total identified assets acquired	**235**		
Identified liabilities assumed			
Borrowings	50	0	50
Provisions	15	0	15
Other liabilities	15	0	15
Deferred tax liabilities (30% tax rate)			
Trade and other payables	50	0	50
Other current liabilities	40	0	40
Contract liabilities	20	0	20
Total identified liabilities assumed	**190**		
Goodwill			

Appendix 5

HydroGenium SE

Combined group's consolidated statement of financial position

as at the beginning of the 2nd half of financial year T

	in EUR million
Assets	
Property, plant and equipment	
Other assets	160
Intangible assets	
Goodwill	
Non-current assets	
Inventories	
Contract assets	
Trade and other receivables	180
Cash and cash equivalents	
Current assets	
Total assets	
Liabilities	
Borrowings	
Provisions	50
Other liabilities	55
Deferred tax liabilities	
Non-current liabilities	
Trade and other payables	210
Other current liabilities	155
Contract liabilities	55
Current liabilities	**420**
Total equity	**380**
Total equity and liabilities	

EXAMINATION I

Economics

Corporate Finance

Financial Accounting and Financial Statement Analysis

Equity Valuation and Analysis

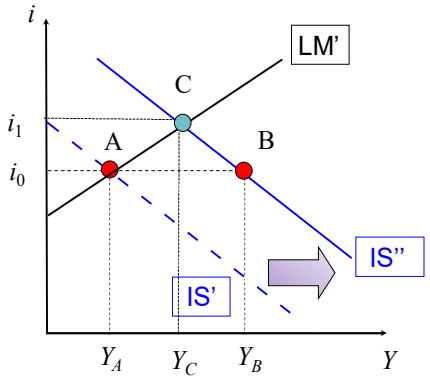
Solutions

Final examination

September 2019

Question 1: Economics **(39 points)**

a)
The IS curve describes the equilibrium relation between GDP and interest rate on the goods and services market. In a closed economy, aggregate demand for goods and services – which is summarized by the IS curve – is composed of consumption, investment, and public expenditure. When one of these components, in our case public expenditure, goes up for any given interest rate, there are both a direct effect (a component of aggregate demand increases) and an indirect effect (an increase in demand raises income, disposable income and hence consumption).

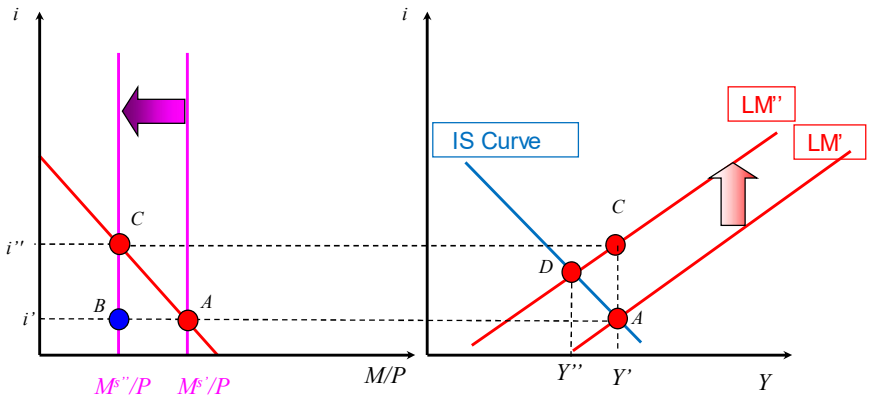


For any given interest rate, the demand is stronger due to increase in public expenditure, which implies a rightward shift of the IS curve. In the picture above, when the interest rate is at the (arbitrarily chosen) level i_0, the increase in public expenditure moves the IS curve from IS' to IS'', and supposing the given LM curve (LM'), the equilibrium moves from A to C. As a result, the output (production) of the economy increase from Y_A to Y_C and the interest rate from i_0 to i_1.

b)
The money market equilibrium is affected by demand and supply of real money balances. The demand for money depends positively on income (Y) and negatively on the interest rate (i). In the Graph below, the demand for money is depicted (in the left panel) for a given level of the real income (see the red negatively-slopped line); the supply of money MS/P is supposed to be under the Central Bank's control (fixed) (see the vertical line). For the initial supply of real money balances (MS'/P), the equilibrium policy rate is i' (point A).

The Central Bank can affect output by changing the interest rate. The increase of the interest rate is achieved by means of a decrease in the supply of money (from MS' to MS''). This induces a disequilibrium in the money market (there is an excess demand of money balances, point B), so that the interest rate must increase, to restore the equilibrium. The new policy rate, consistent with the initial income level, is now i" and the equilibrium is represented by the point C.

The LM curve (in the right panel in the Graph below) shows how the equilibrium between money demand and money supply is affected when income Y changes (for given money supply). In the IS-LM diagram, when the supply of monetary liquidity is decreased, the LM curve shifts upward (from LM' to LM''). For any given level of autonomous demand, propensity to consume and to invest, taxes, and so on (i.e. for a given IS curve) equilibrium output decreases (from A to D), via the discouragement on investment activity.



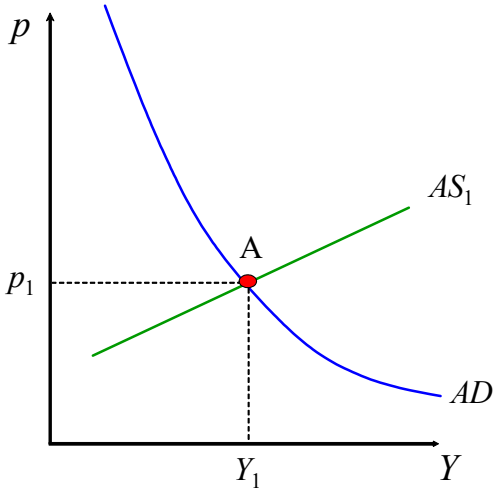
c)

c1)

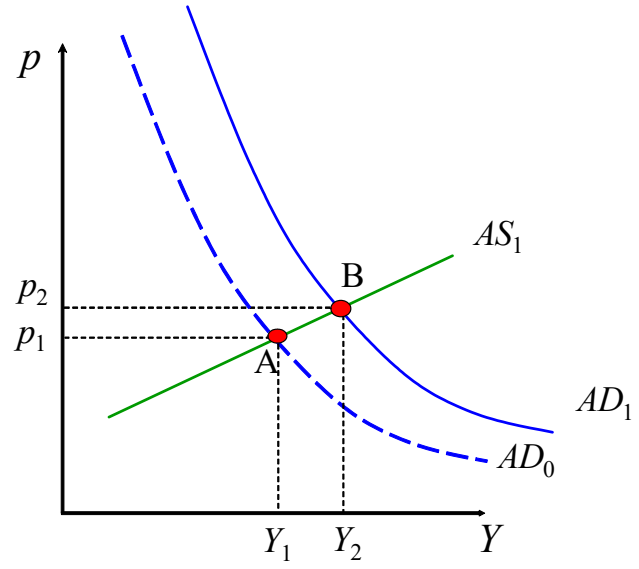
The macroeconomic equilibrium can be summarised by means of the AS-AD model. These relations relate the general price level (P) and output (Y).

The AD curve depends on fiscal policy, monetary policy and the level of the autonomous demand. The AD curve represents combinations of price levels and real income such that the goods and services market is in equilibrium. It is a downward sloping curve because a reduction in prices increases the real money balances, reduces the interest rate and hence increases demand.

The AS curve reflects the short to medium run supply decisions of firms as a function of the country's price level. It is upward sloping due to a slow adjustment in wages. Workers, or their unions, sign contracts with employers determining salaries for several quarters into the future. When there is an increase in the general price level (when inflation becomes higher than expected), workers are paid a smaller real income and businesses consequently have cheaper labour. With cheaper labour, firms hire more workers and expand their production. [Alternative – or complementary – explanations based on sticky prices are acceptable, too]



c2)
The "May Decree" is expanding public expenditure (by 0.5 % of GDP): for any price level, demand is stronger, so that the AD curve moves rightward (From AD_0 to AD_1). The higher demand can be accommodated only when prices are higher (so that firms can expand their output, thanks to cheaper labour). This creates an inflationary pressure (point B, so that the price level moves from p_1 to p_2).



Increasing the interest rate, the Russian Central Bank contrasts the increase in demand (due to the higher interest rate, the increase in demand is lower, due to the negative effect of the interest rate on investment – refer to question b)), and therefore it also contrasts inflation.

d)
Let S_t be the spot Rouble to US Dollar exchange rate, and i_{US} be the interest rate in the United States. The "uncovered interest parity" equation states: $i = i_{US} + \frac{E(S_{t+1}) - S_t}{S_t}$, which implies that the interest rates on domestic deposits should be equal to the interest rate on foreign deposits plus the expected percentage depreciation of the domestic currency.
Political tensions and a general turbulence in emerging markets increase the future (expected) value for the Rouble to US Dollar exchange rate. For given domestic and US interest rates, the spot exchange rate has to increase as well. This can be easily seen solving the above equation for S_t. In fact, one gets: $S_t = \frac{E(S_{t+1})}{1 + i - i_{US}}$, which supports our conclusion.
The same expression suggests that an increase in the domestic policy rate *i* reduces the spot rate (and hence induces an appreciation).

e)
According to the Mundell-Fleming model, the demand in an open economy is given by

$$Z = C + I + G + X - \varepsilon_t M,$$

where:

Z = demand in an open economy
C = private consumption
I = investment
G = government expenditure
X = exports
ε_t = real exchange rate
M = imports

in which X and M are the exports and imports respectively, $\varepsilon_t = \frac{S_t P_t^F}{P_t}$ is the real exchange rate of the Russian Ruble (e.g. with respect to the Dollar), P_t^F represent foreign prices (denominated in the foreign currency), P_t domestic prices, and S_t is defined as above under question d).

Interpreting P_t as the price of exports, a reduction in their price implies an increase in the real exchange rate (a depreciation), which reduces the real value of net export. If the demand for oil and "energy products" is rigid, this reduces demand and hence output.

Question 2: Corporate Finance and Equity Valuation and Analysis (46 points)

a)

Table 1 Impact on Paragon SE's FCFF and FCFE
(Unit: EUR million)

Item to be increased	**Change of FCFF**	**Change of FCFE**
Net income	+100	**+100**
Cash expenses from operations	**-70**	-70
Depreciation	+30	**+30**
Interest expenses	0	**-70**
EBIT	**+70**	+70
Accounts receivable	**-100**	-100
Accounts payable	+100	**+100**
Intangible assets	-100	**-100**
Dividends paid	0	**0**
Proceeds from a capital increase	**0**	0
Share buyback	**0**	0

b)

b1)
The enterprise value of Cannamark is

$$\mathrm{EV}_0 = \frac{\mathrm{FCFF}_1}{\mathrm{WACC}} = \frac{\mathrm{FCFF}_0(1+g)}{\mathrm{WACC}-} = \frac{170(1+0.025)}{0.11-0.025} = \frac{174.25}{0.085} = 2{,}050.0$$

The equity value of Cannamark is

$$\mathrm{V}_0 = \mathrm{EV}_0 - \mathrm{Debt}_0 = 2{,}050.0 - 710.0 = 1{,}340.0$$

Equity value per share is

$$\mathrm{VPS}_0 = \frac{\mathrm{V}_0}{\mathrm{NoSh}} = \frac{1{,}340.0}{200.0} = 6.70$$

Comparing our price target of EUR 6.70 per share with the current share price of EUR 8.00, our investment recommendation is Sell.

b2)
The equity value of Cannamark is
$V_0 = \frac{FCFE_1}{COE-g} = \frac{FCFE_0(1+g)}{COE-g} = \frac{130(1+0.03)}{0.13-0.03} = \frac{133.9}{0.10} = 1{,}339.0$

Equity value per share is
$VPS_0 = \frac{V_0}{NoSh} = \frac{1{,}339.0}{200.0} = 6.70$

Comparing our price target of EUR 6.70 per share with the current share price of EUR 8.00, our investment recommendation is Sell.

c)
The FCFF at the end of year t for the planning period are:

$FCFF_0 = FCFE_t + \text{Interest} \cdot (1 - \text{Tax rate}) =$
$= \text{Net income} + \text{Depreciation} - \text{Capital expenditure} - \text{Change in net working capital}$
$+ \text{Interest} \cdot (1 - \text{Tax rate})$
$= 25 + 18 - 26 - 4 + 15 \cdot (1 - 0.3) = 23.50$

$FCFF_1 = FCFF_0(1 + g) = 23.50 \cdot (1 + 0.08) = 25.38$

$FCFF_2 = FCFF_1(1 + g) = 25.38 \cdot (1 + 0.08) = 27.41$

$FCFF_3 = FCFF_2(1 + g) = 27.41 \cdot (1 + 0.08) = 29.60$

The WACC is
$WACC = 0.11 \cdot 0.60 + 0.07 \cdot (1 - 0.3) \cdot 0.40 = 8.56\ \%$

The terminal value at the end of year 3 is
$TV_3 = \frac{29.60(1+0.06)}{0.0856-0.06} = 1{,}225.76$

The enterprise value of Cannamark at the beginning of the current fiscal year (year0) is
$$EV_0 = \sum \frac{FCFF_t}{(1 + WACC)^t}$$
$$= \frac{23.50}{(1 + 0.0856)^1} + \frac{25.38}{(1 + 0.0856)^2} + \frac{27.41}{(1 + 0.0856)^3} + \frac{29.60}{(1 + 0.0856)^4}$$
$$+ \frac{1{,}225.76}{(1+0.0856)^4} = 968.44$$

The equity value of Cannamark is
$V_0 = EV_0 - Debt_0 = 968.44 - 250.0 \cdot 0.80 = 768.44$

Equity value per share is
$VPS_0 = \frac{V_0}{NoSh} = \frac{768.44}{21.5} = 35.74 > 28.50$

I would buy the shares.

d)
d1)
With P_0/EPS_0 = 33.1x, payout ratio π = 70 %, and growth rate g = 4.0 %

$$\frac{P_0}{EPS_0} = 33.1 = \frac{\pi \cdot (1+g)}{k_E - g} = \frac{0.70 \cdot (1+0.04)}{k_E - 0.04}$$

k_E = 6.20 %

d2)
With the CAPM formula $k_E = r_f + \beta \cdot (r_m - r_f) = 0.0412 + 0.86 \cdot (0.0805 - 0.0412)$
k_E = 7.50 %

Based on k_E = 7.5% the justified price/earnings multiple is:
$\frac{P_0}{EPS_0} = \frac{\pi \cdot (1+g)}{k_E - g} = \frac{0.70 \cdot (1+0.04)}{0.075 - .04} = 20.8x < 33.1x$
Against the long-term background SE's shares look overvalued.

Question 3: Financial Accounting and Financial Statement Analysis (26 points)

a)

Goodwill (preliminary value)		(in million EUR)
	Purchase price (1 point)	48,029
+	(Liabilities assumed (1 point)	24,939
–	Assets acquired) (1 point)	-49,970
=	Goodwill (1 point)	22,998

b)

Adjustment of the purchase price allocation	Change in million EUR
Goodwill (1 point)	-1,400
Other intangible assets (1 point)	+2,000
Property, plant and equipment, other long-term assets	
Short-term assets excluding Cash and Cash equivalents	
Cash and Cash equivalents	
Total assets (0.5 point)	**+600**
Provisions	
Financial liabilities	
Deferred Taxes (1 point)	+600
Other liabilities	
Total liabilities (0.5 point)	**+600**

c)

Changes assuming an acquisition of 75% of the shares of Monsanto in million EUR	
Cash and Cash equivalents	+12,007
Non-controlling interests (49,970 – 24,939) · 0.25 (2 points)	+6,258
Goodwill (22,998 – [36,022 – (49,970 – 24,939) · 0.75] (4 points) Or can be [–12,007+6,258]	-5,749

d)

Changes when using the full goodwill method in million EUR	
Cash and Cash equivalents	+12,007
Non-controlling interests (36,022 / 0.75 · 0.25) (4 points) Or can be [48,029*0.25]	+12,007

e)

Impact of the acquisition on Bayer's statement of cash flows in million EUR		
Cash flow from operating activities		**0**
Sale of non-current assets	(1 point)	10,000
Acquisition of Monsanto (48,029 – 2,657)[1]	(3 points)	-45,372
Cash flow from investing activities	(0.5 points)	**-35,372**
Issue of bonds	(1 point)	25,000
Cash flow from financing activities	(0.5 points)	**25,000**
Change in cash and cash equivalents	(1 point)	-10,372
Cash and cash equivalents as of January 01		13,000
Cash and cash equivalents as of June 30	(1 point)	2,628

[1] Consideration in cash transferred – Cash held by Monsanto = 48,029 – 2,657

Question 4: Corporate Finance and Equity Valuation and Analysis (42 points)

a)
2 % + 0.8 · 5 % = 6 %
Timber's cost of equity is 6 %.

b)
Market value: Short-term borrowings = EUR 30.0 million, straight bond = EUR 130.0 million,
Market capitalization = EUR 300 million · 1.2 = EUR 360 million,
Enterprise value (market value) = 30.0 +130.0 +360.0 = EUR 520.0 million

$$WACC = 2.5\,\% \cdot (1 - 0.4) \cdot \frac{30}{520.00} + 3.0\,\% \cdot (1 - 0.4) \cdot \frac{130.00}{520.00} + 6.0\,\% \cdot \frac{360}{520.00}$$
$$= 4.69\,\%$$

Timber's WACC = 4.69 %

c)
Year T+1: EUR 10 million; Year T+2: EUR 14 million; Year T+3: EUR 15 million
Definition of free cash flows to the firm:
FCFF = operating income · (1 – corporate income tax rate) + depreciation – capital expenditure – change in net working capital

Below are concrete numerical calculations.

(Unit: EUR million)

Year	**T+1**	**T+2**	**T+3**
Operating income × (1 - corporate income tax rate)	33	36	30
(+) depreciation	65	75	80
(-) capital expenditure	75	82	81
(-) change in net working capital	13	15	14
FCFF	10	14	15

d)
The total present value at the beginning of business year T+1 of Company Timber's FCFF for the three years from T+1 to T+3 is EUR 35.356 million. Calculations are below.

$$\frac{10}{1.0475} + \frac{14}{1.0475^2} + \frac{15}{1.0475^3} = \text{EUR } 35.356 \text{ million}$$

Calculation of the Present Value of the Terminal Value of Company Timber:
Present value at the beginning of business year T+1 of annual FCFF from business year T+4 onwards

$$= \frac{15 \times 1.02}{(0.0475 - 0.02)} \times \frac{1}{1.0475^3} = \text{EUR } 484.057 \text{ million}$$

Therefore,
Theoretical value of Company Timber's enterprise value at the beginning of
T+1 = 35.356 + 484.057= EUR 519.413 million

Company Timber's theoretical market capitalization at the beginning of
T+1 = 519.413 - 30 - 130 = EUR 359.413 million

Company Timber's theoretical share price at the beginning of year T+1 = 359.413/30 = EUR 11.98

e)
Value of synergies per share: EUR 180 million /30 million shares = EUR 6.00/share.
Maximum offer price per share:
Theoretical price/share + synergies/share = 12.00 + 6.00 = EUR 18.00
(or: A total purchase price of EUR 540 (=360+180) million for all shares.)

f)
Number of Company ABC shares to be newly issued:

(in EUR million)	Company ABC	Company Timber	Combined
NPV of synergies	90.0	90.0	180.0
Current market capitalization	80 · 25 = 2,000.0	360.0	2,360.0
After transaction fair equity value	2,090.0	450.0	2,540.0

Given the take-over price of EUR 450 million for Company Timber, the number of shares S*, that Company ABC has to offer to Company Timber's shareholders is

$$\frac{S^*}{S^* + 80{,}000{,}000} \cdot \text{Value}_{\text{combined firm}} = \text{EUR } 450 \text{ million}$$

We get:

$$\frac{S^*}{S^* + 80 \text{ mn}} \cdot \text{EUR } 2540 \text{ mn} = \text{EUR } 450 \text{ million}$$

Solving for S* leads to a number of 17,224,880 shares to be newly issued.

[Alternative answer:
Value of Company Timber = 450 million; value of one Company A share including synergies = 2,090mn/80mn = 26.125. Therefore, Company Timber will have to issue 450 million/26.125 = 17,224,880 shares to acquire Company Timber.]

Therefore, the swap ratio of Company ABC shares per share in Company Timber is:
$\frac{17.22488}{30} = 0.57416$ shares

g)
Savings in operating expenses: Both companies are active in the same industry. ABC's market cap is approximately 5.5x Timber's market cap. Therefore, Company ABC very probably has significantly higher sales than Company Timber and significantly higher operating expenses in EUR. If we just add to Company Timber's operating costs of EUR 480 million estimated operating expenses of EUR 2,640 (=480×5.5) million for ABC then we get an operating cost base for the combined firm of EUR 3,120 million. Cost savings of EUR 15 million correspond to less than 0.5% of combined costs and should therefore easily be achieved.

Value of synergy:
FCFF increases by EUR 15 million · (1 – tax rate) = EUR 15 million · 0.6 = EUR 9 million p.a. forever. The present value of this perpetual cash flow stream is

$$\text{PV} = \frac{9\text{ mn}}{0.0475} = \text{EUR } 189 \text{ million}$$

Therefore, an amount of EUR 180 million seems to be a reasonable and conservative estimate.

Question 5: Financial Accounting and Financial Statement Analysis (27 points)

a)

Allocation of the consideration transferred

in EUR million	Carrying value	Adjustment	Fair value
Consideration transferred			320
Identified assets acquired			
Property, plant and equipment	60	15	75
Other assets	45	0	45
Intangible assets	0	120	120
Inventories	45	10	55
Contract assets	20	5	25
Trade and other receivables	55	0	55
Cash and cash equivalents	10	0	10
Total identified assets acquired	**235**	**150**	**385**
Identified liabilities assumed			
Borrowings	50	0	50
Provisions	15	0	15
Other liabilities	15	0	15
Deferred tax liabilities		45	45
Trade and other payables	50	0	50
Other current liabilities	40	0	40
Contract liabilities	20	0	20
Total identified liabilities assumed	**190**	**45**	**235**
Goodwill			**170**

Calculations:
1 Deferred tax liabilities = (Revalued tangible assets + Recognized intangible assets) · Tax rate
= [(15 + 10 + 5) + (15 + 75 + 30)] · 0.30 = EUR 45 million

b)

HydroGenium SE

Combined group's consolidated statement of financial position

as at the beginning of the 2nd half of financial year T

	in EUR million	**Calculus**
Assets		
Property, plant and equipment	225	=150+(60+15)
Other assets	160	=115+45
Intangible assets	180	=60+120
Goodwill	260	=90+170
Non-current assets	**825**	
Inventories	165	=110+(45+10)
Contract assets	80	=55+(20+5)
Trade and other receivables	180	=125+55
Cash and cash equivalents	110	=260 + 10 – 160(=320 · 0.5)
Current assets	**535**	
Total assets	**1360**	
Liabilities		
Borrowings	360	=150+160(=320 · 0.5)+50
Provisions	50	=35+15
Other liabilities	55	=40+15
Deferred tax liabilities	95	=50+(15+10+5+120) · 0.3
Non-current liabilities	**560**	
Trade and other payables	210	=160+50
Other current liabilities	155	=115+40
Contract liabilities	55	=35+20
Current liabilities	**420**	
Total equity	**380**	
Total equity and liabilities	**1,360**	