



EXAMINATION I:

Economics

Corporate Finance

**Financial Accounting and
Financial Statement Analysis**

Equity Valuation and Analysis

Solutions

Final Examination

March 2007

a)

There are three major components of the balance of payments:

- the **current account (CB)**, which records payments for traded goods and services, foreign investment income and unilateral transfers,
- the **capital (and financial) account (KA)**, which reports public and private investment and lending activities,
- the **official reserve account (changes in reserve assets) (ΔRA)**, which records changes in the central bank's holdings of foreign currencies.

When imports exceed exports, net exports are negative and the current account shows a deficit. If this happens over a sustained period of time, then in order to maintain a persistent current account deficit, a country must on a continual basis either sell some of its foreign assets or borrow from the rest of the world (and thus accumulate foreign debt) in order to finance its excess consumption or investment. Also, the greater the accumulated debt as compared with GDP of a borrowing country, the higher will be the interest rate that its residents have to pay for foreign loans. If international lenders lose confidence in the ability of a certain borrowing country (and its individual residents) to repay their international loans, this will lead to a "run on the currency" of the indebted country. The foreign reserves of the country get used up to pay up for essential import and debt servicing and the country ends up with very low foreign reserves. This is termed as a balance of payment crisis.

b)

Current account deficits are not necessarily a sign of economic weakness. A current account deficit can be driven by a large net supply of foreign capital to countries which are perceived by foreign investors as particularly promising in terms of future returns. If foreign investors' confidence rather than domestic overspending is the driving force of a current account deficit, then that deficit is a sign of economic strength.

c)

Free capital mobility, fixed exchange rates and national monetary policy autonomy are mutually inconsistent. Only two of these options are available to governments simultaneously, but never all three. The Indian government wanted to maintain the option of conducting an independent monetary policy. Also since it wanted at the same time to maintain fixed exchange rates, it had to discourage speculation, which required some restraints on capital mobility. Hence a lot of controls were in place on capital inflows and outflows from India during that time.

d)

In the pure floating system, usually referred to as clean float or full float or free float, the exchange rate is determined by the interaction of currency demand and supply. The central bank does not intervene at all. Market participants determine their demands and supplies with respect to price level changes, interest rate differentials, economic growth and other relevant variables. These economic parameters can be influenced by government's policy. The participants respond to changes by adjusting their current and expected future currency needs.

Free floating arrangements give rise to very volatile exchange rates. High exchange rate volatility is often seen as undesirable and disruptive. A sharp appreciation of a country's currency can imperil export industries. On the other hand, a large depreciation can lead to

higher inflation. Furthermore, exchange rate volatility is associated with higher economic uncertainty. International transactions become a risky business due to exchange rate uncertainty.

e)

Inflation in a country is synonymous with the increase of domestic goods prices, which makes the foreign goods cheaper. The country will export less and import more. That, in turn, deteriorates its trade balance (under the Marshall-Lerner condition), as the country becomes internationally less competitive. The demand for foreign currency increases, and hence, foreign currency appreciates against the domestic currency, for purchasing purpose or to hedge against expected inflationary trend, which in turn modifies the exchange rate expectations. As people expect a long-run increase in all domestic prices, including the exchange rate, the expected future exchange rate also increases and causes the rise of the current exchange rate.

Expressing the relation between inflation and exchange rates:

The absolute Purchasing Power Parity (PPP) relation $P_t = S_t \cdot P_t^F$, relates the nominal exchange rate at time t (S_t) with the domestic general price level at time t (P_t) and the foreign general price level at time t (P_t^F).

The relationship between the *change in the exchange rate* and the rates of inflation, which is known as relative Purchasing Power Parity (PPP), is approximately given by: $s_{t-1,t} \approx \pi_{t-1,t} - \pi_{t-1,t}^F$, where $\pi_{t-1,t}$ and $\pi_{t-1,t}^F$ denote domestic and foreign inflation rates between t – 1 and t.

The anticipated change in the exchange rate between the Indian Rupee (INR) and the US dollar (USD) can be calculated using the relative PPP as below:

Country	Subject Description	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
India	Inflation, annual percent change (Percent) $\pi_{t-1,t}$	9	7.2	13.2	4.7	4	3.8	4.3	3.8	3.8	4.2
United States	Inflation, annual percent change (Percent) $\pi_{t-1,t}^F$	2.9	2.3	1.5	2.2	3.4	2.8	1.6	2.3	2.7	3.4
	$s_{t-1,t} \approx \pi_{t-1,t} - \pi_{t-1,t}^F$	6.1	4.9	11.7	2.5	0.6	1	2.7	1.5	1.1	0.8

Since $s_{t-1,t} \approx \pi_{t-1,t} - \pi_{t-1,t}^F$ is positive, the Indian Rupee (INR) will depreciate against the US dollar (USD) over the period.

The answer to question e) is not in agreement with the values shown in the table.

The reason is that the exchange rate does not depend only on the inflation differential between the two countries but a number of other factors.

- i) According to the balance of payments approach, exchange rates depend on the level of imports and exports from a country. The level of imports and exports in turn depend on the inflation rate and the real national incomes.
- ii) According to the monetary approach, the exchange rate reflects the evolution of the relative supplies and demands for the two monies. Hence, the exchange rate depends on the money supply, the real income and the interest rates in the two countries.
- iii) According to the trade-balance-asset approach, current spot exchange rates can be affected by current international trade flows, as well as by changes in expectations concerning future trade flows.
- iv) The intervention by the Central Bank in the foreign exchange markets also affects the exchange rate.
- v) Most macro-economic variables affect the exchange rate over the long-run. It is observed that the exchange rates don't seem to be affected by economic fundamentals in the short run. The observed deviation could be just a short-term phenomenon.

Question 2: Corporate Finance and Equity**(60 points)**a)
a1)

	Robot Unit A	Other Units B combined
Revenues	200	100
- Variable Costs	$0.5 \cdot 200 = 100$	$0.7 \cdot 100 = 70$
- Fixed Costs	20	15
- Depreciation	10	15
= EBIT	70	0
Taxes = EBIT · Tax Rate	$70 \cdot 0.3 = 21$	0
= EBIT	70	0
- Taxes	- 21	0
+ Depreciation	+ 10	15
= Operating CF	= 59	= 15

$$r_{\text{Debt}} = (1 - \text{tax rate}) \cdot (\text{borrowing rate})$$

$$= (1 - 0.3) \cdot 6\% = 4.2\%$$

$$r_{\text{Equity}} = \text{risk-free rate} + \text{beta} \cdot (\text{return on market} - \text{risk-free rate})$$

$$= 4\% + 1.2 \cdot (14\% - 4\%) = 16\%$$

$$wacc = 1/3 \cdot r_{\text{Debt}} + 2/3 \cdot r_{\text{Equity}} = 1/3 \cdot 4.2\% + 2/3 \cdot 16\% = 12.1\%$$

$$\text{Market Value} = \frac{CF \cdot (1 + g)}{wacc - g} = \frac{(59 + 15) \cdot (1 + 0.02)}{0.121 - 0.02} = 747.33 \text{ million}$$

a2)

$$wacc_A = 0.33 \cdot 4.2\% + 0.66 \cdot [4\% + 1.1 \cdot (14\% - 4\%)] = 11.4\%$$

$$\text{Market Value}_A = \frac{(59) \cdot (1 + 0.02)}{0.114 - 0.02} = 640.21 \text{ million}$$

$$wacc_B = 0.33 \cdot 4.2\% + 0.66 \cdot [4\% + 1.4 \cdot (14\% - 4\%)] = 13.4\%$$

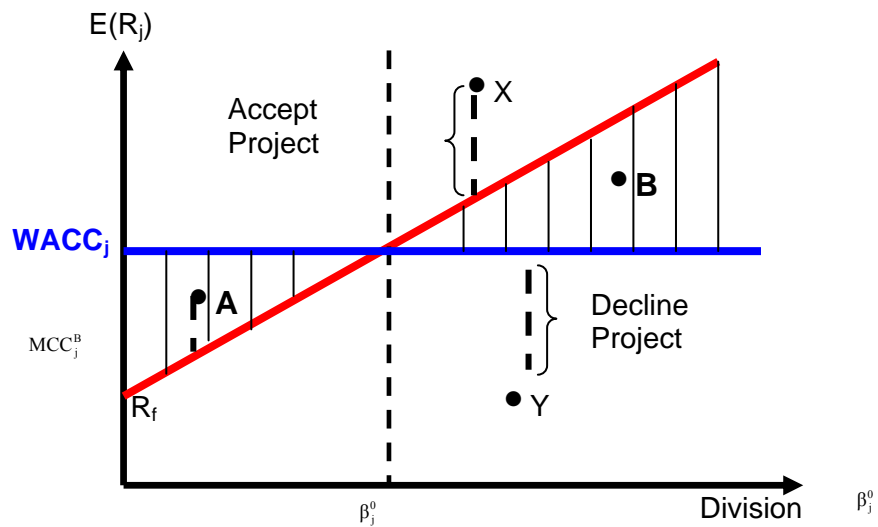
$$\text{Market Value}_B = \frac{(15) \cdot (1 + 0.02)}{0.134 - 0.02} = 134.2 \text{ million}$$

The market value is therefore 774.41 million.

The use of divisional costs of capital makes sense whenever two different business units have a significant difference in risk. Using the WACC of the overall firm could lead to incorrect capital budgeting decisions and investment valuations. For example, even if the internal rate of return of business units A is lower than the WACC for the entire firm and also lower than IRR of units B, it can be still higher than the divisional WACC and we might conclude that the business of units A is worthwhile.

(The following exhibit is for reference purpose. The unit A would generate a lower IRR than the WACC for the entire firm but a higher IRR than required by the divisional WACC. The

opposite holds for unit B. For projects X and Y the decision is independent of the approach used.)



b)

b1)

i) This equation is given in the handout of the CIIA Formulae Final Exam

$$\beta_{\text{levered}} = \beta_{\text{unlevered}} \cdot \left[1 + (1 - \text{tax rate}) \frac{\text{Debt}}{\text{Equity}} \right]$$

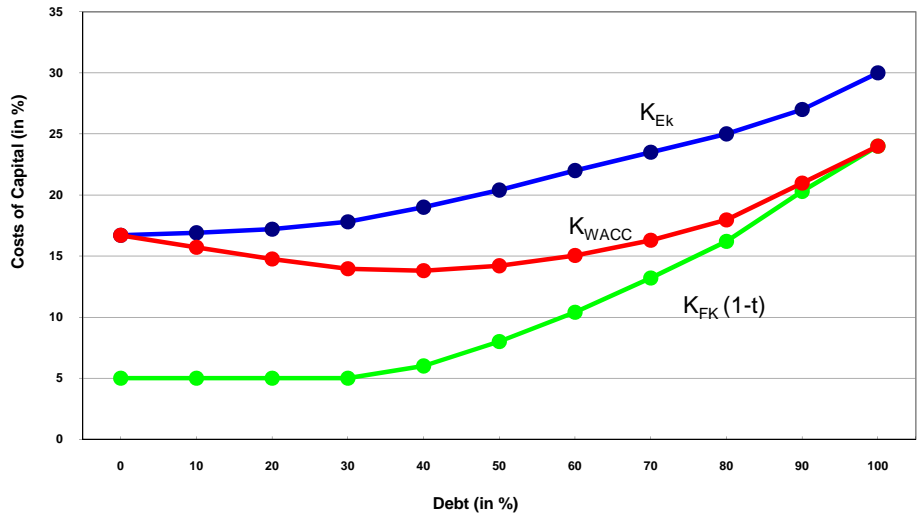
$$\beta_{\text{unlevered}} = \frac{\beta_{\text{levered}}}{\left[1 + (1 - \text{tax rate}) \frac{\text{Debt}}{\text{Equity}} \right]} = \frac{1.1}{1 + (1 - 0.3) \cdot 0.5} = 0.8148$$

$$\text{new } \beta_{\text{levered}} = \beta_{\text{unlevered}} \left[1 + (1 - \text{tax rate}) \frac{\text{Debt}}{\text{Equity}} \right] = 0.8148 \cdot [1 + (1 - 0.3) \cdot 2] = 1.9555$$

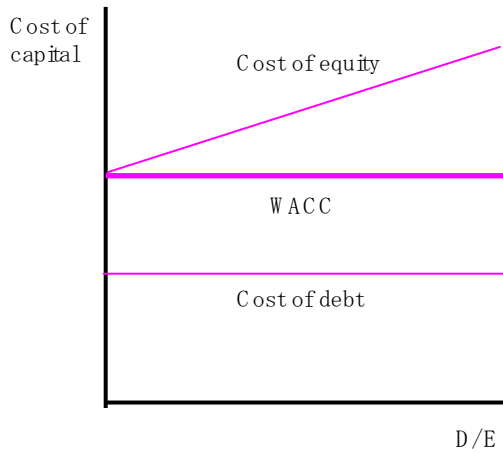
$$\text{new } r_{\text{Equity}} = 4\% + 1.9556 \cdot (14\% - 4\%) = 23.56\%$$

ii)

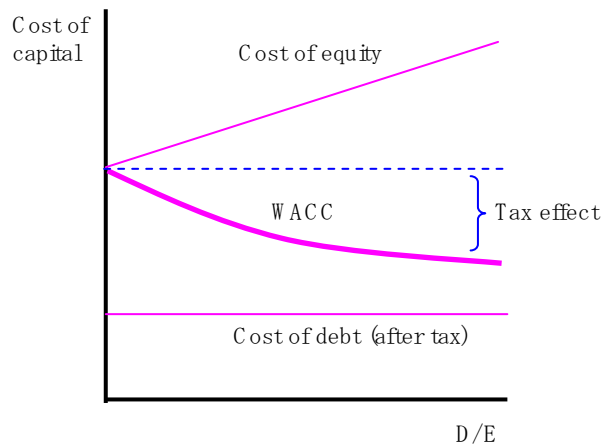
The cost of equity is an increasing function of leverage, because equity holders demand a higher rate of return for the increase in risk. (This holds for the traditional approach as well as in the MM framework). The cost of debt also increases at some point due to higher bankruptcy costs. Because interest payments are tax deductible, there is a tax benefit associated with a higher leverage. Starting with an all equity firm, an increase in debt will first decrease the WACC due to the tax advantage, but eventually will lead to an increase of the WACC due to the higher bankruptcy cost. Thus, at some point the WACC are minimized and the market value of the firm is maximized.



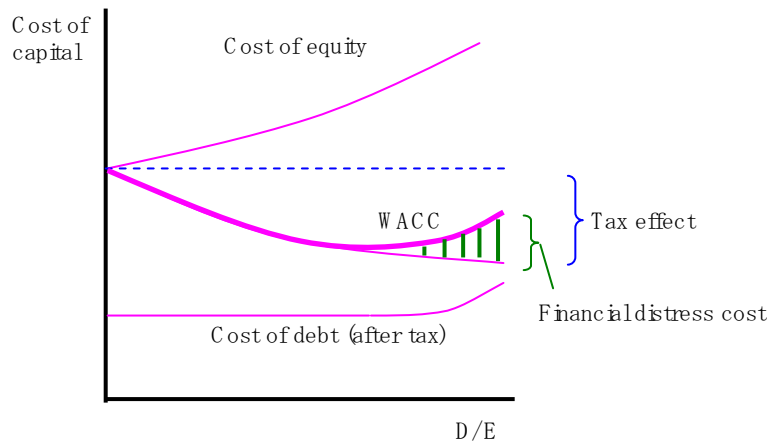
1 Original MM



2 Taking "Tax Effect" into consideration



3 Taking "Financial distress cost" into consideration



iii)

Either case below is acceptable as suggested as an assumption in the question.

Case1 :The cost of debt remains unchanged:

$$WACC = 2/3 \cdot r_{Debt} + 1/3 \cdot \text{new } r_{Equity} = 2/3 \cdot 4.2\% + 1/3 \cdot 23.56\% = 10.7\%$$

In the calculations for unit A the WACC decreases with an increase in leverage. Thus, the tax advantage is higher than the increase in the cost of equity and the bankruptcy cost for debt. The firm is now closer to the optimal capital structure.

Or

Case2 :The cost of debt should be changed:

The cost of debt should be higher in the real world because of financial distress cost. So, let's use 6% instead of 4.2%.

$$WACC = 2/3 \cdot r_{Debt} + 1/3 \cdot \text{new } r_{Equity} = 2/3 \cdot 6\% + 1/3 \cdot 23.56\% = 11.9\% > 11.4\%$$

In the calculations for unit A the WACC decreases with an increase in leverage. Thus, the tax advantage is higher than the increase in the cost of equity and the bankruptcy cost for debt to a certain point. But beyond that, the effect of the bankruptcy cost will be larger. The above new WACC indicates that the firm is now beyond the optimal capital structure.

b2)

i)

	Robot Unit A
Revenues	200
- Variable Costs	$0.4 \cdot 200 = 80$
- Fixed Costs	20
- Depreciation	10
= EBIT	90
Taxes = EBIT * Tax Rate	$90 \cdot 0.3 = 27$
EBIT	90
- Taxes	- 27
+ Depreciation	+ 10
= Operating CF	= 73

Market Value_A

$$= \frac{CF_0 \cdot (1 + g_1)}{(1 + wacc)} + \frac{CF_0 \cdot (1 + g_1)^2}{(1 + wacc)^2} + \frac{CF_0 \cdot (1 + g_1)^2 (1 + g_2)}{wacc - g_2} \cdot \frac{1}{(1 + wacc)^2}$$

$$= \frac{73 \cdot (1 + 0.1)}{(1 + 0.107)} + \frac{73 \cdot (1 + 0.1)^2}{(1 + 0.107)^2} + \frac{73 \cdot (1 + 0.1)^2 (1 + 0.05)}{0.107 - 0.05} \cdot \frac{1}{(1 + 0.107)^2} = 1,472.4 \text{ million}$$

ii)

Using the dividend growth model the three factors are:

- (1) an increase in operating cash flows (higher dividends),
- (2) a higher expected growth rate for the cash flows and
- (3) a decrease in WACC.

c) (5 points)

	Other Units B combined
Revenues	100
- Variable Costs	$0.5 \cdot 100 = 50$
- Fixed Costs	10
- Depreciation	15
= EBIT	25
Taxes = EBIT · Tax Rate	$25 \cdot 0.3 = 7.5$
EBIT	25
- Taxes	- 7.5
+ Depreciation	+ 15
= Operating CF	= 32.5

$$\text{Market Value}_B = \frac{CF \cdot (1 + g)}{wacc - g} = \frac{32.5 \cdot (1 + 0.04)}{0.134 - 0.04} = 359.57 \text{ million}$$

d)

Stock Repurchase:

The stock market reaction depends on a number of different factors. A share buyback usually signals positive information resulting in a “positive information effect”. It signals that from the management’s perspective the share is undervalued. Buying back shares is a means to reduce agency problems in the sense of Jensen’s free cash flow hypothesis.

Increase of Dividend Payouts:

Increasing the dividend payouts will also lead to reduce agency problems in the sense of Jensen’s free cash flow theory. It also signals positive information in the sense of the Lintner study. Management will only increase dividends if they expect higher cash flow in the future.

In the original MM irrelevance framework dividend changes as well as share buybacks should not result in stock price changes.

Question 3: Equity Valuation and Analysis**(27 points)**

a)

The expected market capitalization of IT Corporation at the time of an IPO 5 years hence
= Projected net profits five years hence · Projected PER
= EUR 20 million · 30 = EUR 600 million

The value of IT's shares after the equity finance can be calculated by discounting this value by the 50% required rate of return on IT shares:

$$\frac{\text{EUR } 600,000,000}{1.5^5} = \text{EUR } 79,012,346$$

b)

The value of existing shares at the time of the equity finance is found by subtracting the amount of the capital increase from market capitalization after the equity finance:

$$\text{EUR } 79,012,346 - \text{EUR } 5,000,000 = \text{EUR } 74,012,346$$

The theoretical share price at the time of the equity finance is obtained by dividing this amount by the number of issued and outstanding shares:

$$\text{EUR } 74,012,346 \div 1,000,000 \text{ shares} = \text{EUR } 74.01$$

Alternative answer:

Most venture capitalists use the following calculation.

The percentage ownership required by venture capitalists can be found by dividing the amount of the capital increase by market capitalization after the equity finance:

$$\text{Required percentage ownership} = \text{EUR } 5,000,000 \div \text{EUR } 79,012,346 = 6.328\%$$

The number of newly issued shares and the share price can be found with the following formula:

Number of newly issued shares

$$= (\text{Required percentage ownership} / (1 - \text{Required Percentage Ownership})) \cdot \text{Number of existing shares}$$

$$= (0.06328 / (1 - 0.06328)) \cdot 1'000'000 \text{ shares} = 67'555 \text{ shares}$$

Share price

$$= \text{Investment} / \text{Number of newly issued shares}$$

$$= \text{EUR } 5'000'000 / 67'555 \text{ shares} = \text{EUR } 74.01$$

c)

The following are conceivable reasons:

- Private equity shares have low liquidity and are difficult to sell. Higher required rates of return include a liquidity premium that reflects this liquidity risk (liquidity)
- New startups have an extremely high risk of bankruptcy. Higher required rates of return include a premium that reflects this bankruptcy risk (risk)

- Unlike investments in listed companies, investments in private equities require that venture capitalists commit to their management if they are to succeed. Higher required rates of return include the reward to the services provided by venture capitalists (services)
- The business plans and profit forecasts of new startups tend to be optimistic and often are not achieved. Higher required rates of return can be interpreted as adjustment to the overly-optimistic figures provided by management (forecast adjustments)

d)

d1)

Generally, when an option is purchased, its value is higher the higher the volatility in the price of the underlying asset because if the transaction does not go in one's favor losses are limited to be option premium, while if it does go in one's favor, capital gains are unlimited. Startup companies contain a great deal of uncertainty regarding future potential and directions and have many different options for developing the business depending on circumstances and are therefore suitable to valuation using the "real option" approach.

d2)

The current set of valuation and decision making tools aren't sufficient for the new business realities:

- strategic investments with lots of uncertainty and huge capital requirements.
- projects that must adapt to evolving conditions.
- complex asset structures through partnerships, licenses, and joint ventures.

Question 4: Financial Accounting**(50 points)**

a) Measurement of assets

a1) Buildings

Carrying amount according to the cost model on 31 December 2006:

$$4,000 - (7/40 \cdot 4,000) = 3,300$$

Revaluation reserve based on the revaluation model:

Fair value 31 December 2006	3,800
- Carrying amount 31 December 2006	- 3,300
= Revaluation reserve	500

The revaluation model would lead to an additional equity of 500 kCU.

a2) Inventory

beginning inventory

$$20,000 \cdot 20.00 = 400,000$$

+ purchases

$$9 \text{ Aug.: } 6,000 \cdot 22.00 = 132,000$$

$$22 \text{ Aug.: } 8,000 \cdot 19.00 = \underline{152,000}$$

$$284,000$$

./ sales

$$25 \text{ Aug.: } 18,000 \cdot 20.12^* = 362,160$$

$$\text{(with exact multiplier: } 362,118)$$

ending inventory

$$16,000 \cdot 20.12 = \underline{321,920}$$

$$\text{(with exact multiplier: } \underline{321,882})$$

$$* ((20,000 \cdot 20.00) + (6,000 \cdot 22.00) + (8,000 \cdot 19.00)) / (20,000 + 6,000 + 8,000)$$

$$= (400,000 + 284,000) / 34,000 = 20.12 \text{ CU}$$

b) Acquisition

b1)

Earth Ltd

Equity at fair value = assets at fair value – liabilities at fair value

$$= (3,500 + 750 + 6,000 + 2,500) - (1,250 + 4,000) = 12,750 - 5,250 = 7,500$$

$$\text{Proportional equity at fair value} = 7,500 \cdot 0.6 = 4,500$$

$$\text{Goodwill} = 5,000 - 4,500 = \underline{500}$$

Water Ltd

Equity at fair value = assets at fair value – liabilities at fair value

$$= (600 + 2,000 + 10,000 + 4,000) - (2,000 + 8,000) = 16,600 - 10,000 = 6,600$$

$$\text{Proportional equity at fair value} = 6,600 \cdot 0.5 = 3.300$$

$$\text{Goodwill} = 5,000 - 3,300 = \underline{1,700}$$

b2)

Earth Ltd

$$\text{Minority interests} = 7,500 \cdot 0,4 = \underline{3,000}$$

Water Ltd

No minority interests for joint ventures.

b3)

total assets of Sky Ltd	70,000
- investment in Earth Ltd	- 5,000
- investment in Water Ltd	- 5,000
+ assets of Earth Ltd at fair value	+ 3,500 + 750 + 6,000 + 2,500
+ assets of Water Ltd at fair value	+ (600 + 2,000 + 10,000 + 4,000) · 0.5
+ goodwill of Earth Ltd	+ 500 (depending on the answer found in b1)
<u>+ goodwill of Water Ltd</u>	<u>+ 1,700</u>
=	<u>83,250</u>

b4)

revenues of Sky Ltd after intercompany elimination

revenues with third parties	20,000
+ revenues with Earth Ltd	+ 0
+ revenues with Water Ltd	+ 8,000 · 0.5

revenues of Earth Ltd after intercompany elimination

+ revenues with third parties	+ 5,000
+ revenues with Sky Ltd	+ 0
+ revenues with Water Ltd	+ 2,000 · 0.5

revenues of Water Ltd after intercompany elimination

+ revenues with third parties	+ 10,000 · 0.5
+ revenues with Sky Ltd	+ 0

revenues of Sky Ltd Group after intercompany elimination = 35,000

c) Cash Flow Statement

c1)

Cash flow from operating activities refers to the cash generated by all the transactions, which are neither investing nor financing activities of a company. It includes all those activities which are central to the company's business.

Cash flow from investing activities deals with capital expenditure and proceeds from disposal of non-current assets. It includes the acquisition and disposal of businesses and shares of other companies (e.g. subsidiaries, joint ventures).

Cash from financing activities deals with all payments in connection with the capital resources of a company. It includes payments to the shareholders and debtors as well as receipts from them.

c2)

- Dividends paid => Cash flow from financing activities
- Cash received from sale of products => Cash flow from operating activities
- Cash received from disposal of production facilities => Cash flow from investing activities
- Cash paid for inventories => Cash flow from operating activities
- Cash paid for acquisition of company shares => Cash flow from investing activities
- Salary payment => Cash flow from operating activities

c3)

The cash flow from operating activities can be presented according to direct method or indirect method. The direct method consists in disclosing directly major classes of gross cash receipt and gross cash payments. The indirect method calculates the operating cash flow by adjusting net income for effects of non-cash transactions and effects of change in working capital.