

**CHAPTER 21**

**FREE CASH FLOW VALUATION**

1. (C) a common stockholder.

**Explanation**

Dividends are most relevant to the stockholders who receive them and who have little control over their amount.

(Module 21.1, LOS 21.b)

**Related Material**

[SchweserNotes - Book 3](#)

2. (A) Two-stage free cash flow to the firm (FCFF) model.

**Explanation**

Of the cash flow valuation models mentioned above, the two-stage FCFF model is most useful in analyzing the firms that have high leverage and high growth. The high growth will make the stable growth models inapplicable, while the high leverage makes the FCFF model more attractive.

(Module 21.5, LOS 21.j)

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Beachwood Builders merged with Country Point Homes in December 31, 1992. Both companies were builders of mid-scale and luxury homes in their respective markets. In 2004, because of tax considerations and the need to segment the businesses between mid-scale and luxury homes, Beachwood decided to spin-off Country Point, its luxury home subsidiary, to its common shareholders. Beachwood retained Bernheim Securities to value the spin-off of Country Point as of December 31, 2004.

When the books closed on 2004, Beachwood had \$140 million in debt outstanding due in 2012 at a coupon rate of 8%, a spread of 2% above the current risk free rate. Beachwood also had 5 million common shares outstanding. It pays no dividends, has no preferred shareholders, and faces a tax rate of 30%. When valuing common stock, Bernheim's valuation models utilize a market risk premium of 11%.

The common equity allocated to Country Point for the spin-off was \$55.6 million as of December 31, 2004. There was no long-term debt allocated from Beachwood.

The Managing Director in charge of Bernheim's construction group, Denzel Johnson, is prepping for the valuation presentation for Beachwood's board with Cara Nguyen, one of the firm's associates. Nguyen tells Johnson that Bernheim estimated Country Point's net income at \$10 million in 2004, growing \$5 million per year through 2008. Based on Nguyen's calculations, Country Point will be worth \$223.7 million at the end of 2008. Nguyen decided to use a cost of equity for Country Point in the valuation equal to its return on equity at the end of 2004 (rounded to the nearest percentage point).

Nguyen also gives Johnson the table she obtained from Beachwood projecting depreciation (the only non-cash charge) and capital expenditures:

\$(in millions)	2004	2005	2006	2007	2008
Depreciation	5	6	5	6	5
Capital Expenditures	7	8	9	10	12

Looking at the numbers, Johnson tells Nguyen, "Country Point's free cash flow (FCF) will be \$25 million in 2006." Nguyen adds, "That's FCF to the Firm (FCFF). FCF to Equity (FCFE) will be lower."

3. (C) both are incorrect.

**Explanation**

To estimate FCF, we can construct the following table using the table given and the information about growth in net income:

\$(in millions)	2004	2005	2006	2007	2008
Net Income	10	15	20	25	30
Plus: Depreciation	5	6	5	6	5
Less: Capital Expenditures	7	8	9	10	12
Free Cash Flow	8	13	16	21	23

The estimated free cash flow for 2006 is \$16 million. Johnson's statement is incorrect. Since none of Beachwood's debt is allocated to Country Point, all the financing is in the form of equity, so FCFF and FCFE are equal. Nguyen's statement is also incorrect.

(Module 21.5, LOS 21.k)

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4. (A)  $FCFE = (EBIT \times (1 - \text{tax rate})) + \text{Depreciation} - FCInv - WCInv.$

**Explanation**

The correct version of this equation is:

$$FCFF = (EBIT \times (1 - \text{tax rate})) + \text{Depreciation} - FCInv - WCInv$$

(Module 21.5, LOS 21.k)

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5. (B) 7%.

**Explanation**

We know the terminal value in 2008 is \$223.7 million. We can calculate the free cash flow in 2008 to be \$23 million (= \$30 million net income + \$5 million depreciation – \$12 million capital expenditures). (See the table in question 1).

Thus, we can solve for the estimated growth rate:

$$\text{Terminal value} = [CF@2008 \times (\text{growth rate} + 1)] / (\text{discount rate} - \text{growth rate})$$

$$223.7 \text{ million} = (\$23 \text{ million} \times (\text{growth rate} + 1)) / (0.18 - \text{growth rate})$$

$$223.7 \text{ million} \times (0.18 - \text{growth rate}) = 23 \text{ million} \times (\text{growth rate} + 1)$$

$$40.266 - (223.7 \times \text{growth rate}) = 23 \text{ million} + (23 \times \text{growth rate})$$

$$17.266 = 246.7 \times (\text{growth rate})$$

$$\text{growth rate} = 0.07$$

Nguyen's growth rate assumption is 7% per year

(Module 21.5, LOS 21.k)

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6. (C) 1.09.

**Explanation**

The risk free rate is  $(8\% - 2\%) = 6\%$ . We are told that the market risk premium is 11%, and we calculated the cost of equity (required return) to be  $(10 \text{ million} / 55.6 \text{ million} =) 18\%$ . Since we know the risk-free rate, the market risk premium, and the discount rate, we can use the capital asset pricing model to solve for beta:

$$\text{Required rate of return} = 0.18 = 0.06 + (b \times 0.11)$$

$$0.18 - 0.06 = b \times 0.11$$

$$0.12 = b \times 0.11$$

$$b = 1.09$$

(Module 21.5, LOS 21.k)

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7. (A) Dividends are often viewed as "sticky." Managers are reluctant to radically change the dividend payout policy while FCFE often has immense variability.

**Explanation**

Dividends and the FCFE are often different and dividends are used as a signal to the market not FCFE. Dividends viewed as sticky is the true statement.

(Module 21.5, LOS 21.f)

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8. (A) increase in the year the borrowing occurred.

**Explanation**

An increase in financial leverage will increase net borrowing and, hence, increase FCFE in the year the borrowing occurred because:  $FCFE = FCFF - [\text{interest expense}] (1 - \text{tax rate}) + \text{net borrowing}$ .

(Module 21.5, LOS 21.f)

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9. (C) after-tax interest and net borrowing.

**Explanation**

$FCFE = FCFF - [\text{interest expense}] (1 - \text{tax rate}) + \text{net borrowing}$ .

(Module 21.1, LOS 21.a)

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10. (B) dividend payments.

**Explanation**

A firm's FCFE is the cash available to stockholders after funding capital expenditures and debt principal repayments.

(Module 21.5, LOS 21.f)

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11. (C) consistent with assumptions of other variables.

**Explanation**

The assumption of growth should be consistent with assumptions about other variables, Net capital expenditures (capital expenditures minus depreciation) and beta (risk) used to calculate required rate of return should be consistent with assumed growth rate.

(Module 21.5, LOS 21.j)

**Related Material**

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CFA<sup>®</sup>**12. (B) may be higher than free cash flow to equity FCFE.****Explanation**

Dividends represent the cash that the firm chooses to pay to the shareholders and the amount of the dividend is subject to the discretion of the firm. Dividends can be equal to, lower or higher than FCFE. For example, sometimes firms may pay dividends in years when there is a net loss.

(Module 21.5, LOS 21.f)

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**13. (C) after-tax weighted average cost of capital.****Explanation**

Since the FCFF is the cash available to all the investors, the after-tax weighted average cost of capital should be used as the discount rate in FCFF models.

(Module 21.1, LOS 21.a)

**Related Material**

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**14. (C) non-cash charges and interest charges are zero.****Explanation**

The answer is shown by the relationship between FCFF and net income:  $FCFF = NI + NCC + Int(1 - \text{tax rate}) - FCInv - WCInv$ . Further:  $FCFF = EBIT(1 - \text{tax rate}) + Dep - FCInv - WCInv$ , which assumes that depreciation is the only non-cash charge.

(Module 21.5, LOS 21.h)

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**15. (B) Interest payments to bondholders.****Explanation**

Interest payments to bondholders are included in the income statement and are already subtracted to calculate net income.

(Module 21.1, LOS 21.c)

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**16. (B) plus after-tax interest expense.****Explanation**

Free cash flow to the firm is equal to cash flow from operations minus fixed capital investment plus after-tax interest expense.

(Module 21.2, LOS 21.c)

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Michael Patrick, CFA, is a new analyst at EKS Inc., an investment management company based in New York. Patrick is attempting to value Johan Corp., a U.S. based company using free cash flows. Exhibits 1 through 2 present extracts from the financial statements, which are prepared according to U.S. GAAP.

**Exhibit 1**

Johan Corp. Summary Balance Sheets on 31 December (U.S. \$ millions)		
	2x12 Forecast	2x11 Actual
Cash	50	40
Accounts receivable	220	200
Inventory	265	245
<b>Current assets</b>	<b>535</b>	<b>485</b>
Gross PP&E	2,000	1,600
Accumulated depreciation	(950)	(890)
<b>Total assets</b>	<b>1,585</b>	<b>1,195</b>
Accounts payable	50	50
Short-term debt	70	50
<b>Current liabilities</b>	<b>120</b>	<b>100</b>
Long-term debt	620	400
Common stock	335	335
Retained earnings	510	360
<b>Total liabilities and equity</b>	<b>1,585</b>	<b>1,195</b>

**Exhibit 2**

Johan Corp. Summary Income Statement (U.S. \$ millions)		
	2x12 Forecast	2x11 Actual
EBIT	415	380
EBITDA	475	430
Interest expense	200	180
<b>Tax rate 30%</b>		

There will be no sales of long-term assets in 2x12.

Patrick who is unfamiliar with the free cash flow technique has been reviewing EKS's handbook for some guidance. The statements below are extracts from the handbook:

Statement Share repurchases will reduce FCFE and will leave FCFF unchanged.

- 1: Statement Changes in leverage have a minor effect on FCFE and no effect on FCFF. For example, decreasing leverage through repayment of debt will decrease FCFE in the current year and increase forecasted FCFE in future years.
- 2: Statement The loss on a sale of a long-term asset that has been included in operating expenses is a non-cash charge that should be adjusted for when calculating FCFF from EBIT.
- 3: Statement The loss on a sale of a long-term asset that had been included in operating expenses is a non-cash charge that should be adjusted for when calculating FCFF from EBIT.
- 4: Statement The formula to calculate FCFF based on EBITDA is:  $FCFF = EBITDA(1 - \text{tax rate}) - FC_{Inv} - WC_{Inv}$

Patrick is also looking to value a potential takeover target, Fite Inc. Patrick has gathered the following data on Fite Inc. All figures are in millions of dollars.

	2x11	2x10	2x09	2x08
Net income	– \$12	\$110	\$50	\$95
FCFE	– \$5	–\$35	\$45	–\$20
FCFF	\$9	\$11	\$12	\$14
Dividends	\$10	\$10	\$9	\$9
Debt-to-equity	97%	94%	81%	85%

Patrick decides to use the most recent 2x11 FCFF of \$9 to estimate the value of the firm. He decides to use a three-stage model and makes the following assumptions:

High growth phase: FCFE will grow at 30% for the next three years. WACC = 18%

Transitional phase: For the following 3 years, growth will decline by 8% per year down to a stable growth rate of 6%. WACC = 15%

Stable-growth period: Growth will remain at 6% forever. WACC = 10%

**17. (A) –89.5.**

**Explanation**

$$FCFF = EBIT \times (1 - \text{tax rate}) + \text{dep} - FC_{INV} - WC_{INV}$$

$$FCFF = 415 \times (1 - 0.30) + 60 - 400 - 40 = -89.5$$

Alternatively:

$$FCFF = [EBITDA \times (1 - \text{tax rate})] + (\text{dep} \times \text{tax rate}) - FC_{INV} - WC_{INV}$$

$$FCFF = [475 \times (1 - 0.30)] + (60 \times 0.30) - 400 - 40 = -89.5$$

**Depreciation:**

Accumulated depreciation 31 December 2011 = \$890

Accumulated depreciation 31 December 2012 = \$950

With no asset sales during the period the depreciation charge for 2012 = \$60

**Fixed capital investment:**

This is equal to capital expenditures (because there are no asset sales), which is equal to the change in gross PP&E:

$$FC_{INV} = 2000 - 1600 = 400$$

**Working capital investment:**

This is the change in the working capital accounts, excluding cash and short-term borrowings.

Working capital = receivables + inventory – payables

$$WC_{INV} = (220 + 265 - 50) - (200 + 245 - 50) = 40$$

(Module 21.4, LOS 21.d)

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**18. (A) 10.5.**

**Explanation**

$$FCFE = FCFF - \text{Int} (1 - \text{tax rate}) + \text{net borrowing}$$

$$FCFE = -89.5 - 200(1 - 0.3) + 240 = 10.5$$

Net borrowing is the difference between the long-term and short-term debt accounts (the impact caused by amortization of premiums and discounts should be removed if debt is not issued at par):

$$= (620 + 70) - (400 + 50) = 240$$

Alternatively:

$$FCFE = NI + \text{dep} - FC_{INV} - WC_{INV} + \text{net borrowing}$$

$$= [(415 - 200) \times 0.7] + 60 - 400 - 40 + 240 = 10.5$$

(Module 21.4, LOS 21.d)

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**19. (B) Incorrect Correct**

**Explanation**

Dividends, share repurchases, and share issues have no effect on either FCFF or FCFE. FCFF and FCFE represent the total cash flow available before financing decisions. Share repurchases represent uses of those cash flows.

If debt is repaid FCFE, will decrease in the current year because of reduced (negative) net borrowings and will increase in future years as interest expense is reduced.

(Module 21.1, LOS 21.b)

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 20. (C) **Correct**    **Incorrect**
**Explanation**

$$\text{FCFF} = [\text{EBIT} \times (1 - \text{tax rate})] + \text{dep} - \text{FC}_{\text{INV}} - \text{WC}_{\text{INV}}$$

We assume that the only non-cash charge that appears above EBIT is depreciation. In general however the rule is to adjust for any non-cash charges that appear above EBIT.

$$\text{FCFF} = [\text{EBITDA} \times (1 - \text{tax rate})] + (\text{dep} \times \text{tax rate}) - \text{FC}_{\text{INV}} - \text{WC}_{\text{INV}}$$

(Module 21.4, LOS 21.d)

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 21. (B) **free cash flow to the firm model.**
**Explanation**

A dividend discount model is inappropriate, as dividends are not related to the earnings stream. In addition, as this is a takeover situation a free cash flow approach is more suitable as the acquirer has control and discretion over the distribution of the total free cash flow. With dividend discount models a minority interest is assumed (i.e., no control over dividend policy).

FCFF model is preferred to FCFE as FCFE is negative and volatile and leverage is high.

(Module 21.1, LOS 21.d)

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 22. (A) **379.**
**Explanation**

High Growth Period	Year 1	Year 2	Year 3
Growth rate	30%	30%	30%
FCFF	11.7	15.21	19.773
PV(@18%)	9.915	10.924	12.034

Transitional Period	Year 4	Year 5	Year 6
Growth rate	22%	14%	6%
FCFF	24.123	27.500	29.150
PV(@18%/15%)	$\frac{1}{1.15 \times 1.18^3}$	$\frac{1}{1.15^2 \times 1.18^3}$	$\frac{1}{1.15^3 \times 1.18^3}$
	= 12.767	= 12.656	= 11.666

Terminal value as of Year 6 using the FCFF projected for Year 7.

$$\text{Terminal value} = 29.150 (1.06) / (0.10 - 0.06) = 772.48$$

$$\text{PV of terminal value} = 772.48 / (1.15^3 \times 1.18^3) = 309.135$$

Value of the firm =  $9.915 + 10.924 + 12.034 + 12.767 + 12.656 + 11.666 + 309.135 = 379$

(Module 21.5, LOS 21.k)

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**23. (A) with patents or firms in an industry with significant barriers to entry.**

**Explanation**

The two-stage model is best suited to analyzing firms in a high growth phase that will maintain that growth for a specific period, such as firms with patents or firms in an industry with significant barriers to entry. Companies growing at a rate similar to or less than the nominal growth rate of the economy are best suited for the single-stage FCFE Model. Companies in high growth industries correspond to the three-Stage FCFE Model.

(Module 21.5, LOS 21.j)

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Ashley Winters, CFA, has been hired to value Goliath Communications, a company that is currently experiencing rapid growth and expansion. Winters is an expert in the communications industry and has had extensive experience in valuing similar firms. She is convinced that a value for the equity of Goliath can be reliably obtained through the use of a three-stage free cash flow to equity (FCFE) model with declining growth in the second stage. Based on up-to-date financial statements, she has determined that the current FCFE per share is \$0.90. Winters has prepared a forecast of expected growth rates in FCFE as follows:

<b>Stage 1:</b>	10.5% for years 1 through 3
<b>Stage 2:</b>	8.5% in year 4, 6.5% in year 5, 5.0% in year 6
<b>Stage 3:</b>	3.0% in year 7 and thereafter

Moreover, she has determined that the company has a beta of 1.8. The current risk-free rate is 3.0%, and the equity risk premium is 5.0%.

Other financial information:

Outstanding shares	10 million
Tax rate	40.0%
Interest expense	\$750,000
Net borrowing	-\$100,000
Cost of debt	7.5%
Debt-to-equity ratio	25.0%
Estimated growth rate for the firm	4.0%

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24. (A) \$16.86.

**Explanation**

Estimates for the future FCFE based on supplied growth rates are:

Year	1	2	3	4	5	6	7
Growth rate	10.5%	10.5%	10.5%	8.5%	6.5%	5.0%	3.0%
FCFE/share	\$0.995	\$1.099	\$1.214	\$1.318	\$1.403	\$1.473	\$1.518

$$R_s = 1.518 / (12.0\% - 3.0\%) = 16.861$$

(Module 21.5, LOS 21.k)

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25. (B) \$13.55.

**Explanation**

We find the value of the equity/share by discounting all future FCFE/share by the required rate of return on equity.

$$\text{Value of equity /share} = \frac{0.995}{(1.12)} + \frac{1.099}{(1.12)^2} + \frac{1.214}{(1.12)^3} + \frac{1.318}{(1.12)^4} + \frac{1.403}{(1.12)^5} + \frac{1.473 + 16.867}{(1.12)^6} = \$13.55 / \text{share}$$

Using our calculator, enter CF<sub>0</sub> = 0; CO1 = 0.995; CO2 = 1.099; CO3 = 1.214; CO4 = 1.318; CO5 = 1.403; CO6 = 1.473 + 16.867 = 18.34; I = 12; Compute → NPV = 13.55.

(Module 21.5, LOS 21.k)

**Related Material**

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26. (A) 10.5%.

**Explanation**

The debt-to-equity ratio of 25.0% means that the debt-to-total value is 25.0%/125.0% or 20.0%.

The weight of debt is thus 20.0% and the weight of equity is 80.0%.

$$\text{The WACC} = [0.20 \times (0.075) \times (1 - 0.40)] + (0.80 \times 0.12) = 10.5\%$$

(Module 21.5, LOS 21.k)

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CFA<sup>®</sup>**27. (A) \$153 million.****Explanation**

The estimated FCFF for year 0 is \$9.55 million and the WACC is 10.5% as calculated. If the growth rate for the firm is estimated as 4.0%, the value of the firm is:

$$\$9.55 \text{ million} \times (1.04)/(0.105 - 0.04) = \$152,800,000.$$

(Module 21.5, LOS 21.k)

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**28. (B) higher than depreciation in the stable-growth phase.****Explanation**

If capital expenditures estimates are significantly higher than depreciation for the stable growth period, then the three-stage FCFE model might result in an extremely low value. One possible solution for the problem is to grow the capital expenditures more slowly than depreciation in the transition period to narrow the difference. Another is to assume that capital expenditures and depreciation will offset when growth normalizes.

(Module 21.1, LOS 21.a)

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**29. (A) a required rate of return close to the market rate of return and capital expenditures that are not too large relative to depreciation expense.****Explanation**

A firm that is in a stable growth phase should have growth rate close to that of the economy, and the cost of equity should approximate the required rate of return on the market. In addition, expense. the capital expenditures should not be disproportionately large relative to the depreciation expenses.

(Module 21.5, LOS 21.j)

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**30. (B) lower than the required rate of return used for the high-growth phase.****Explanation**

In most cases, the required rate of return used to calculate the terminal value should be lower than the required rate of return used for initial high-growth phase. During the stable period the firm is less risky and the required rate of return is therefore lower.

(Module 21.5, LOS 21.l)

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31. (C) Required returns are higher in FCFE discount models than they are in dividend discount models, since FCFE is more difficult to estimate.

**Explanation**

Although FCFE may be more difficult to estimate than dividends, the required return is based on the risk faced by the shareholders, which would be the same under both models.

(Module 21.5, LOS 21.f)

**Related Material**

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32. (C) \$77.15.

**Explanation**

The required rate of return in the high-growth period is  $(r) = 0.04 + 1.3(0.06) = 0.118$ .

The required rate of return in the stable-growth period is  $(r) = 0.04 + 1.0(0.06) = 0.10$ .

The Present Value (PV) of the FCFE in the high-growth period is  $(3.05 / 1.118) + (4.10 / 1.118^2) + (5.24 / 1.118^3) + (6.71 / 1.118^4) = 14.06$ .

The Terminal Price = Expected  $FCFE_{n+1} / (r - g_n)$  with  $FCFE_{n+1} = FCFE$  in year 5 =  $\text{Earnings per share} - (\text{Capital Expenditures} - \text{Depreciation})(1 - \text{Debt Ratio}) - (\text{Change in working capital})(1 - \text{Debt Ratio}) = 8.10 - 0(1 - 0.4) - 2.00(1 - 0.4) = 6.90$ .

The Terminal Price =  $6.90 / (0.10 - 0.03) = 98.57$ .

The PV of the Terminal Price =  $(98.57 / 1.118^4) = 63.09$ .

The value of a share today is the PV of the FCFE in the high-growth period plus the PV of the Terminal Price =  $14.06 + 63.09 = 77.15$ .

(Module 21.5, LOS 21.k)

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33. (C) \$195.71.

**Explanation**

Year 1 FCFE =  $\text{Earnings per share} - (\text{Capital Expenditures} - \text{Depreciation})(1 - \text{Debt Ratio}) - (\text{Change in working capital})(1 - \text{Debt Ratio}) = 6.60 - (2.28 - 1.37)(1 - 0.25) - (1.1)(1 - 0.25) = 5.09$ .

Year 8 FCFE =  $\text{Earnings per share} - (\text{Capital Expenditures} - \text{Depreciation})(1 - \text{Debt Ratio}) - (\text{Change in working capital})(1 - \text{Debt Ratio}) = 24.27 \times 1.05 - 0 - (2.25)(1 - 0.25) = 23.79$ .

The Terminal Value (as of Year 7) =  $23.79 / (0.10 - 0.05) = 475.80$ .

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The value of BOX, Inc., stock would be equal to:  $5.09 / 1.25 + 7.63 / 1.25^2 + 11.01 / [(1.25)^2(1.15)^1] + 14.67 / [(1.25)^2(1.15)^2] + 18.08 / [(1.25)^2(1.15)^3] + 20.62 / [(1.25)^2(1.15)^4] + 21.89 / [(1.25)^2(1.15)^5] + 475.80 / [(1.25)^2(1.15)^5] = 4.07 + 4.88 + 6.13 + 7.10 + 7.61 + 7.55 + 6.97 + 151.40 = 195.71$

(Module 21.5, LOS 21.k)

**Related Material**

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**34. (B) Free cash flow (FCF).**

**Explanation**

Dividend policy can be changed by the buyer of a firm. Thus, the FCF perspective looks to the source of dividends in a position of control rather than directly at dividends. The price to enterprise value approach does not focus on cash flows.

(Module 21.1, LOS 21.b)

**Related Material**

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**35. (C) \$11.21.**

**Explanation**

**Step 1: Calculate each year's FCFE and discount at the required return.**

- $FCFE = \text{net income} + \text{depreciation} - \text{capital expenditures} - \text{increase in working capital} - \text{principal repayments} + \text{new debt issues}$
- Year 1:  $10.0 + 3.0 - 2.5 - 1.0 - 1.5 = 8.0$ ,
- $PV = 7.08 = 8.0 / (1.13)^1$ , or  $FV = -8.0, I = 13, PMT = 0, N = 1$ , Compute PV
- Year 2:  $10.0 \times 1.10 + 3.0 - 2.5 - 1.0 - 1.5 = 9.0$ ,
- $PV = 7.05 = 9.0 / (1.13)^2$ , or  $FV = -9.0, I = 13, PMT = 0, N = 2$ , Compute PV
- Year 3:  $10.0 \times (1.10)^2 + 3.0 - 2.5 - 1.0 - 1.5 = 10.10$
- $PV = 7.00 = 10.10 / (1.13)^3$ , or  $FV = -10.10, I = 13, PMT = 0, N = 3$ , Compute PV

**Step 2: Calculate Present Value of final cash flow times FCFE multiple.**

- Value at end of year 3 =  $FCFE_3 \times \text{multiple} = 10.10 \times 13 = 131.30$
- $PV = 91.00 = 131.30 / (1.13)^3$ , or using calculator,  $N = 3, FV = -131.30, I = 13, PMT = 0$ , Compute PV

**Step 3: Calculate per share value.**

- Add up PV of FCFE and end value and divide by number of shares outstanding
- $= (7.08 + 7.05 + 7.00 + 91.0) / 10.0 = 11.21$

(Module 21.4, LOS 21.d)

**Related Material**

[SchweserNotes - Book 3](#)

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36. (A) calculate historical free cash flow and apply an expected growth rate.

**Explanation**

Historical free cash flows are often used for forecasting.

(Module 21.5, LOS 21.e)

**Related Material**

[SchweserNotes - Book 3](#)

37. (A) The value will decrease.

**Explanation**

Everything else being constant, a decrease in free cash flow to equity should decrease the value of the firm.

(Module 21.5, LOS 21.i)

[SchweserNotes - Book 3](#)

**Related Material**

38. (B) Two-stage FCFE Model.

**Explanation**

The two-stage FCFE model is most suited for analyzing firms in high growth that will maintain that growth for a specific period, such as firms with patents or firms in an industry with significant barriers to entry.

(Module 21.5, LOS 21.j)

**Related Material**

[SchweserNotes - Book 3](#)

39. (B) There is a transition period where the growth rate declines.

**Explanation**

In the three-stage FCFE model, there is an initial phase of high growth, a transition period where the growth rate declines, and a steady-state period where growth is stable.

(Module 21.5, LOS 21.j)

**Related Material**

[SchweserNotes - Book 3](#)

40. (A) fairly valued.

**Explanation**

Based on a free cash flow valuation model, Sudbury Industries shares appear to be fairly valued.

Since Sudbury is an all-equity firm, WACC is the same as the required return on equity of 8%.

The firm value of Sudbury Industries is the present value of FCFF discounted by using WACC. Since FCFF should grow at a constant 3 percent rate, the result is:

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Firm value =  $FCFF_1 / WACC-g = 400 \text{ million} / 0.08-0.03 = 400 \text{ million} / 0.05 = \$8,000 \text{ million}$

Since the firm has no debt, equity value is equal to the value of the firm. Dividing the \$8000 million equity value by the number of outstanding shares given the estimated value per share:

$V_0 = \$8,000 \text{ million} / 100 \text{ million shares} = \$80.00 \text{ per share}$

(Module 21.5, LOS 21.m)

**Related Material**

[SchweserNotes - Book 3](#)

41. (C) **\$2,975.00.**

**Explanation**

The stable growth FCFF model assumes that FCFF grows at a constant rate forever. FCFF in Year 0 is equal to  $EBIT(1 - \text{tax rate}) + \text{Depreciation} - \text{Capital Spending} - \text{Working Capital Additions} = 500(1 - 0.4) + 200 - 300 - 30 = 170$ . The Firm Value =  $FCFF_1 / (r - g_n) = 170(1.05) / (0.11 - 0.05) = \$2,975$ .

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

42. (C) **decrease.**

**Explanation**

Debt repayment will decrease net borrowing and, hence, decrease FCFE because:  $FCFE = FCFF - [\text{interest expense}] (1 - \text{tax rate}) + \text{net borrowing}$ .

(Module 21.5, LOS 21.f)

**Related Material**

[SchweserNotes - Book 3](#)

43. (A) **\$50,000,000.**

**Explanation**

The overall value of the firm is  $\$4,000,000 / (0.10 - 0.05) = \$80,000,000$ . Thus, the value of equity is  $\$80,000,000 - \$30,000,000 = \$50,000,000$ .

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

Jon Binkster, CFA, is researching a U.S. based company Busicomb Inc., who have just released their financial statements for the year ended December 20x5. These financial statements are included in Exhibits 1-3 below.



**Exhibit 1**

Busicomb Inc. Annual Income Statement	
Sales	721.9
Operating expenses	(417.0)
Operating profit	304.9
Gain on sale of fixed assets	9.6
Depreciation	(170.8)
Earnings before interest and tax	143.7
Interest expense	(40.3)
Pre-tax income	103.4
Income taxes	(31.0)
Net income	72.4

**Exhibit 2**

Busicomb Inc. Balance Sheet As of December 31 (in \$ millions)		
	20x5	20x4
Current Asset	31.2	14.0
Cash and equivalents		
Accounts receivable	72.0	64.8
Inventories	501.7	453.7
<b>Total current assets</b>	<b>604.9</b>	<b>532.5</b>
<b><u>Non-Current Assets</u></b>		
Property, plant, and equipment	1138.7	982.7
Less: Accumulated depreciation	(370.0)	(216.0)
Net property, plant, and equipment	768.7	766.7
<b>Total assets</b>	<b>1373.6</b>	<b>1299.2</b>
<b><u>Current Liabilities</u></b>		
Accounts payable	60.1	62.5
Notes payable	30.0	20.0
<b>Total current liabilities</b>	<b>90.1</b>	<b>82.5</b>
<b><u>Non-Current Liabilities</u></b>		
Long term debt	576.0	588.0
<b>Total liabilities</b>	<b>666.1</b>	<b>670.5</b>
<b><u>Shareholders Equity</u></b>		
Common equity	384.0	360.0
Retained earnings	323.5	268.7
<b>Total equity</b>	<b>707.5</b>	<b>628.7</b>
<b>Total liabilities and equity</b>	<b>1373.6</b>	<b>1299.2</b>

**Exhibit 3**

<b>Busicomb Inc. Cash Flow Statement</b> <b>For the year Ended December 31, 20x5 (in millions)</b>		
<b><u>Cash Flow from Operating Activities</u></b>		
Net income		72.4
Depreciation		170.8
Gain on sale of fixed assets		(9.6)
<b><u>Change in Working Capital</u></b>		
(Increase) Decrease in accounts receivable	(7.2)	
(Increase) Decrease in inventories	(48.0)	
Increase (Decrease) in accounts payable	(2.4)	
Net change in working capital		(57.6)
Net cash from operating activities		176.0
<b><u>Cash Flow from Investing Activities</u></b>		
Purchase of property, plant, and equipment	(183.2)	
Proceeds on disposal of plant and equipment	20.0	
Net cash from investing activities		(163.2)
		12.8
<b><u>Cash Flow from Financing Activities</u></b>		
Change in debt outstanding	(2.0)	
Change in common stock	24.0	
Payment of cash dividend	(17.6)	
Net cash from financing activities		4.4
Net change in cash and cash equivalents		17.2
Cash at beginning of period		14.0
Cash at end of period		31.2

Busicomb Inc. announces a new strategic alliance that will require it to sell products on behalf of a very successful major European manufacturing and distribution operation. Binkster decides to value Busicomb using the dividend discount model (DDM) and the free cash flow-to-firm model (FCFF). Binkster undertakes a review of the financial performance of Busicomb Inc. using Exhibits 1 to 3 and forecasts related to the new sales contract, Binkster reaches the following conclusions:

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- Earnings are expected to grow at 18%, next year before stabilizing to a long-term growth rate of 6% after six years (i.e., year 6). You can assume that the growth rate declines evenly each year between the high growth and the low growth period.
- The current payout ratio will be maintained, and the firm has a long-term target debt to capital ratio of 50%.
- Basicomb Inc. has an equity beta of 1.3.
- Government bond yield is 4.5% and the market equity risk premium is 6%.
- There are 12 million shares outstanding.
- The market value of the debt in the balance sheet of Basicomb Inc. is not materially different from the book value.
- The required rate of return of the debt holders is 7%.
- The effective tax rate of Basicomb is 30%.

**44. (A) Total asset turnover is 0.556, financial leverage is 2.07, and ROE is 11.5%.**

**Explanation**

ROE using the DuPont three component approach:

ROE = profit margin x asset turnover x financial leverage

$$= \frac{\text{profit}}{\text{sales}} \times \frac{\text{sales}}{\text{assets}} \times \frac{\text{assets}}{\text{equity}}$$

$$= \frac{72.4}{721.9} \times \frac{721.9}{1299.2} \times \frac{1299.2}{628.7}$$

$$= 0.100 \times 0.556 \times 2.066 = 0.1149 = 11.5\%$$

Note that it is typical to compute ROE based on opening equity for valuation contexts, whilst in FRA we typically use average values. The CFA Institute curriculum does note that some analyst compute ROE in a valuation context using average balance sheet values so care should be taken to follow the instructions in the question whether to use opening or average values.

(Module 20.3, LOS 20.p)

**Related Material**

[SchweserNotes - Book 3](#)

**45. (B) 8.7%.**

**Explanation**

Sustainable growth rate:

$$g = \text{ROE} \times \text{earnings retention rate}$$

$$g = 11.54\% \times (1 - (17.6 / 72.4)) = 11.54\% \times 0.757 = 8.736\%$$

(Module 20.3, LOS 20.p)

**Related Material**

[SchweserNotes - Book 3](#)

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46. (A) **\$33 per share.**

**Explanation**

$$\begin{aligned} \text{Cost of equity} &= R_f \beta(R_m - R_f) \\ &= 4.5\% + 1.3(6\%) = 12.3\% \end{aligned}$$

Using the H model:

$$\text{Dividend} = 17.6\text{m} / 12\text{m} = \$1.47$$

$$MV_0 = \frac{D_0(1 + g_1)}{k - g_1} \times \frac{D_0 \times H(g_h + g_1)}{k - g_1}$$

$$MV_0 = \frac{1.47(1 + 0.06)}{(0.123 - 0.06)} \times \frac{1.47 \times \frac{6}{2} (0.18 - 0.06)}{(0.123 - 0.06)}$$

$$MV = \$24.73 + \$8.40$$

$$MV = \$33.13$$

(Module 20.3, LOS 20.n)

**Related Material**

[SchweserNotes - Book 3](#)

47. (C) **\$1,968m.**

**Explanation**

Using a two stage model:

$$FCFF_1 = \$46\text{m}$$

$$WACC = (12.3\% \times 0.5) + (7 \times (1 - 0.3) \times 0.5) = 8.6\%$$

$$MV_{\text{firm}} = \frac{46}{(1.086)^1} + \frac{46(1.12)}{(1.086)^2} + \frac{46(1.12)^2}{(1.086)^3} + \frac{46(1.12)^2(1.06)}{(0.086 - 0.06)(1.086)^3}$$

$$MV_{\text{firm}} = 42.36 + 43.68 + 45.05 + 1,836.69$$

$$MV_{\text{firm}} = 1967.78$$

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

48. (B) **The Dividend Discount approach.**

**Explanation**

The dividend discount model is most appropriate for valuing a minority equity position in a dividend-paying company. The free cash flow approach looks to the source of dividends from the perspective of an owner that has control rather than directly at dividends.

(Module 21.1, LOS 21.b)

**Related Material**

[SchweserNotes - Book 3](#)

CFA<sup>®</sup>**49. (A) depreciation.****Explanation**

Depreciation is usually the largest non-cash expense.

(Module 21.2, LOS 21.c)

**Related Material**

[SchweserNotes - Book 3](#)

**50. (A) The value will increase.****Explanation**

Everything else being constant, a decrease in the relevant required rate of return should increase the value of the equity per share.

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

**51. (C) dividends are not paid.****Explanation**

Free cash flow approaches are best when dividends are not paid. Both remaining responses have nothing to do with the decision.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

**52. (C) The value in controlling the firm's dividend policy.****Explanation**

The difference between the value estimate produced by the DDM and the one produced by the FCFE model can be interpreted as the value of controlling the firm's dividend policy.

(Module 21.5, LOS 21.g)

**Related Material**

[SchweserNotes - Book 3](#)

**53. (C) will be financed using the target debt ratio.****Explanation**

It is usually assumed that the investment in working capital will be financed consistent with the target debt ratio.

(Module 21.5, LOS 21.e)

**Related Material**

[SchweserNotes - Book 3](#)

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54. (C) **dividends are paid but do not reflect the company's capacity to pay dividends.**

**Explanation**

FCF approaches are best when dividends are paid but do not appear to be representative of the firm's capacity to pay them. Both remaining responses have nothing to do with the decision.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

55. (A) **use different discount rates.**

**Explanation**

Free cash flow to the firm uses the weighted average cost of capital and free cash flow to equity uses the cost of equity. The key is to use a discount rate that reflects the opportunity cost of the indicated investor group.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

56. (C) **deducting taxes, adding back depreciation, and deducting the investments in fixed capital and working capital.**

**Explanation**

As presented in the reading:  $FCFF = EBIT(1 - \text{tax rate}) + \text{Dep} - FC_{\text{Inv}} - WC_{\text{Inv}}$

(Module 21.2, LOS 21.c)

**Related Material**

[SchweserNotes - Book 3](#)

57. (C) **\$5.09.**

**Explanation**

Year 1 FCFE = Earnings per share – (Capital Expenditures – Depreciation) (1 – Debt Ratio) – Change in working capital (1 – Debt Ratio)

Year 1 FCFE = 6.60 – (2.28 – 1.37)(1 – 0.25) – (1.1)(1 – 0.25) = 5.09

(Module 21.4, LOS 21.d)

**Related Material**

[SchweserNotes - Book 3](#)

58. (A) **the required rate of return exceeds the growth rate.**

**Explanation**

The one-stage model using either free cash flow to equity (FCFE) or free cash flow to the firm (FCFF) assumes that the required rate of return exceeds the growth rate. If this was not the case, the model would produce an unrealistic negative price.

(Module 21.5, LOS 21.j)

**Related Material**

[SchweserNotes - Book 3](#)

Burcar-Eckhardt, a firm specializing in value investments, has been approached by the management of Overhaul Trucking, Inc., to explore the possibility of taking the firm private via a management buyout. Overhaul's stock has stumbled recently, in large part due to a sudden increase in oil prices. Management considers this an opportune time to take the company private. Burcar would be a minority investor in a group of friendly buyers.

Jaimie Carson, CFA, is a private equity portfolio manager with Burcar. He has been asked by Thelma Eckhardt, CFA, one of the firm's founding partners, to take a look at Overhaul and come up with a strategy for valuing the firm. After analyzing Overhaul's financial statements as of the most recent fiscal year-end (presented below), he determines that a valuation using Free Cash Flow to Equity (FCFE) is most appropriate. He also notes that there were no sales of PPE.

Overhaul Trucking, Inc. Income Statement April 30, 2005 (Millions of dollars)		
	2005	2006E
Sales	300.0	320.0
Gross Profit	200.0	190.0
SG&A	50.0	50.0
Depreciation	70.0	80.0
EBIT	80.0	60.0
Interest Expense	30.0	34.0
Taxes (at 35 percent)	17.5	9.1
<b>Net Income</b>	<b>32.5</b>	<b>16.9</b>

Overhaul Trucking, Inc. Balance Sheet April 30, 2005 (Millions of dollars)		
	2005	2006E
Cash	10.0	15.0
Accounts Receivable	50.0	55.0
Gross Property, Plant & Equip.	400.0	480.0
Accumulated Depreciation	(160.0)	(240.0)

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<b>Total Assets</b>	<b>300.0</b>	<b>310.0</b>
Accounts Payable	50.0	70.0
Long-Term Debt	140.0	113.1
Common Stock	80.0	80.0
Retained Earnings	30.0	46.9
<b>Total Liabilities &amp; Equity</b>	<b>300.0</b>	<b>310.0</b>

Eckhardt agrees with Carson's choice of valuation method, but her concern is Overhaul's debt ratio. Considerably higher than the industry average, Eckhardt worries that the firm's heavy leverage poses a risk to equity investors. Overhaul Trucking uses a weighted average cost of capital of 12% for capital budgeting, and Eckhardt wonders if that's realistic.

**59. (C) interest payments to bondholders.**

**Explanation**

FCFF includes the cash available to all of the firm's investors, including bondholders. Therefore, interest payments to bondholders are not removed from revenues to derive FCFF. FCFE is FCFF minus interest payments to bondholders plus net borrowings from bondholders.

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

**60. (C) Overhaul's debt ratio is significantly higher than the industry average.**

**Explanation**

The difference between FCFF and FCFE is related to capital structure and resulting interest expense. When the company's capital structure is relatively stable, FCFE is easier and more straightforward to use. FCFF is generally the best choice when FCFE is negative or the firm is highly leveraged. The fact that Overhaul's debt ratio is significantly higher than the industry average would argue against the use of FCFE. Hence, this is the least likely reason to favor FCFE.

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

**61. (B) 7%.**

**Explanation**

Since Firm Value =  $FCFF_1 / (WACC - g)$ , we first need to determine  $FCFF_1$ , which is FCFF in 2006:  $FCFF = NI + NCC + [Int \times (1 - tax\ rate)] - FCInv - WCInv$

$$= 16.9 + 80 + [34 \times (1 - 0.35)] - (480 - 400) - [(55 - 70) - (50 - 50)]$$

$$= 16.9 + 80 + 22.1 - 80 - (-15) = 54$$

$$\text{Firm Value} = FCFF_1 / (WACC - g)$$



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$$1080 = 54 / (0.12 - x)$$

$$[(1080)(0.12)] - 1080x = 54$$

$$129.6 - 1080x = 54$$

$$75.6 = 1080x$$

$$0.07 = x$$

The expected growth rate in FCF that Carson must have used is 7%.

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

62. (A) **\$26.5 million.**

**Explanation**

$$FCFE = NI - [(1 - DR) \times (FCInv - Dep)] - [(1 - DR) \times WCInv]$$

Where: DR = target debt to asset ratio

$$FCFE = 16.9 - [(1 - 0.36) \times (480 - 400 - 80)] - [(1 - 0.36) \times ((55 - 70) - (50 - 50))]$$

$$= 16.9 - (0.64 \times 0) - (0.64 \times (-15))$$

$$= 16.9 + 0 + 9.6 = 26.5$$

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

63. (B) **\$0.77.**

**Explanation**

$$FCFE = \text{net profit} - \text{NetFCInv} - \text{WCInv} + \text{DebtFin}$$

$$= \$1.88 - \$1.63 - 0.38 + 0.90$$

$$= 0.77$$

(Module 21.4, LOS 21.d)

**Related Material**

[SchweserNotes - Book 3](#)

64. (A) **the growth rate in the stable-period is too high.**

**Explanation**

If the growth rate in the stable-period is too high or the high-growth and transition periods are too long, the three-stage FCFE model might result in an extremely high value.

(Module 21.5, LOS 21.j)

**Related Material**

[SchweserNotes - Book 3](#)

65. (C) **Weighted average cost of capital.**

**Explanation**

Free cash flow to the firm valuation uses the opportunity cost relevant to the overall firm, which is the weighted average cost of capital.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

Michael Ballmer is an equity analyst with New Horizon Research. The firm has historically relied on dividend and residual income valuation models to value equity, but the firm's director of research, Doug Leads, has decided that the firm needs to incorporate free cash flow valuations into its practices. Therefore, Leads decides to send Ballmer to a seminar on free cash flow valuation.

Upon his return from the convention, Ballmer is excited to share his newfound knowledge with his co-workers. Ballmer is asked to give a debriefing to New Horizon's team of equity analysts, where he makes the following statements:

**Statement 1:** Free cash flow to the firm is the amount of the firm's cash flow that is free for the firm to use in making investments after cash operating expenses have been covered.

**Statement 2:** Free cash flow to equity, then, is the amount of the firm's cash flow that is free for equity holders after covering cash operating expenses, working capital and fixed capital investments, interest principal payments to bondholders, and required dividend payments.

After discussing the calculation of free cash flow to the firm and free cash flow to equity from historical information, Ballmer proceeds to explain the major approaches for forecasting free cash flow. He focuses his discussion on forecasting the components of free cash flow as this method is more flexible. During his presentation, several of the analysts notice that the formula for forecasting free cash flow to equity does not include net borrowing. They bring this to Ballmer's attention, and he states that he will look into the formula and send out an updated presentation after the meeting.

A week after the meeting, Jonathan Hodges approached Ballmer regarding two issues he had while applying free cash flow based valuations. The first issue that Hodges had was that he calculated the equity value of a firm using both free cash flow to equity based and dividend-based valuations and arrived at different values. The second issue that Hodges came across was the effect of a change in a firm's target leverage on FCFE. One of the firms that Hodges was analyzing may reduce leverage, and Hodges needs to know if this will affect his valuation.

CFA<sup>®</sup>**66. (C) No, neither interpretation is correct.****Explanation**

Free cash flow to the firm (FCFF) is the cash flows that are free to investors after cash operating expenses (including taxes but excluding interest expense), working capital investments, and fixed capital investments have been made. Free cash flow to equity (FCFE) is FCFF less interest payments to bondholders and net borrowing from bondholders.

(Module 21.1, LOS 21.a)

**Related Material**[SchweserNotes - Book 3](#)**67. (C) The target debt-to-asset ratio accounts for the financing of new investment in fixed capital and working capital.****Explanation**

When forecasting FCFE, it is common to assume that a firm will maintain a target debt-to-asset ratio for new investments in fixed capital and working capital. Based on this assumption, the formula for forecasting FCFE is:

$$\text{FCFE} = \text{NI} - [(1 - \text{DR}) \times (\text{FCInv} - \text{Dep})] - [(1 - \text{DR}) \times \text{WCInv}]$$

By multiplying the fixed capital and working capital investments by one minus the target debt-to-asset ratio, you are left with the investment amount less the amount financed by debt, which is the net borrowing amount. Therefore, this formula accounts for net borrowing through the target debt-to-asset ratio.

(Module 21.1, LOS 21.a)

**Related Material**[SchweserNotes - Book 3](#)**68. (C) Yes, the free cash flow from equity valuation would be higher if there were a premium associated with control of firm.****Explanation**

The ownership perspectives of dividend-based and FCFE based valuations are different. Dividend-based valuations take the perspective of minority shareholders, while FCFE based valuations take the perspective of an acquirer who will assume a controlling position in the firm. If investors were willing to pay a premium for a controlling position in the firm, then the equity value computed under the FCFE approach would be higher.

(Module 21.1, LOS 21.a)

**Related Material**[SchweserNotes - Book 3](#)

CFA<sup>®</sup>**69. (A) Current year FCFE decreases, but future FCFE will be increased.****Explanation**

Changes in leverage do have a small effect on FCFE. A decrease in leverage will cause the current year FCFE to decrease through the repayment of debt. Future FCFE will be increased because interest expense will be lower.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

**70. (A) \$81.54.****Explanation**

Use the two-stage FCFF model to value the firm. The Terminal Value of the firm as of Year 3 =  $11.56 / (0.12 - 0.02) = 115.60$ . The value =  $5.95 / (1.20) + 7.06 / (1.20)^2 + (8.25 + 115.62) / (1.20)^3 = 81.54$ .

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

**71. (B) the definition of cash flows.****Explanation**

The primary difference between the dividend discount models and the free cash flow from equity models lies in the definition of cash flows. The FCFE model uses residual cash flows after meeting all financial obligations and investment needs. The DDM uses a strict definition of cash flows to equity, that is, the expected dividends on the stock.

(Module 21.5, LOS 21.g)

**Related Material**

[SchweserNotes - Book 3](#)

**72. (A) high growth in free cash flow for n years and then constant growth in free cash flow forever after.****Explanation**

The two-stage model using either FCFE or FCFF typically assumes a high growth of free cash flow for  $n$  years and then a constant growth in free cash flow forever after. Multi-stage models assume that the required rate of return exceeds the growth rate in the last stage. In a two-stage free cash flow models, the growth rate in the second stage represents the long-run sustainable growth rate, which is generally a low rate that is close to the GDP growth rate.

(Module 21.5, LOS 21.j)

**Related Material**

[SchweserNotes - Book 3](#)

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73. (A) **\$60,000,000.**

**Explanation**

The value of equity is  $[(\$4,000,000)(1.05) / (0.12 - 0.05)] = \$60,000,000.$

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

TOY, Inc. is a company that manufactures dolls, games, and other items to entertain children.

The following table provides background information for TOY, Inc. on a per share basis in the year 0:

Current information	Year 0
Earnings	\$5.00
Capital Expenditures	\$2.40
Depreciation	\$1.80
Change in Working Capital	\$1.70
Cost of equity	12.0%
Target debt ratio	30.0%
Market value of stock	\$56.00
Shares outstanding	5.0 million
Interest expense	\$7.2 million
Cash & short-term investments	\$40.0 million
Tax rate	37.5%

Earnings, capital expenditures, depreciation, and working capital are all expected to grow by 5.0% per year in the future.

74. (A) **\$3.56.**

**Explanation**

FCFE year 0 = Earnings per share – [(Capital Expenditures – Depreciation) x (1 – Debt Ratio)] – [(Change in working capital) x (1 – Debt Ratio)] =  $5.00 - [(2.40 - 1.80) \times (1 - 0.30)] - [(1.70) \times (1 - 0.30)] = 3.39.$

FCFE for year 1 = FCFE year 0 x (1 + growth rate) =  $3.39 \times (1.05) = \$3.56.$

(Module 21.5, LOS 21.m)

**Related Material**

[SchweserNotes - Book 3](#)

CFA<sup>®</sup>**75. (A) \$50.86.****Explanation**

The value of the stock =  $FCFE_1 / (r - g_n) = 3.56 / (0.12 - 0.05) = 50.86$ .

(Module 21.5, LOS 21.m)

**Related Material**

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**76. (A) overvalued.****Explanation**

Our calculated value of the stock =  $FCFE_1 / (r - g_n) = 3.56 / (0.12 - 0.05) = \$50.86$ . The current market price is \$56.00, because the market price is greater than the estimated price, the stock is overvalued in the market.

(Module 21.5, LOS 21.m)

**Related Material**

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**77. (C) greater than the total value of the firm.****Explanation**

The total value of a firm is the total market value of equity plus the total market value of debt. The total value of equity is \$56.00 per share x 5,000,000 shares = \$280 million. Equity represents 70.0% of the capital structure. The total value of the firm is thus \$280 million/0.70 = \$400 million. An offer of \$450 million is a premium of \$50 million - a price greater than the current value of the firm.

(Module 21.5, LOS 21.m)

**Related Material**

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**78. (B) the expected growth rate is too high for a stable firm.****Explanation**

If the expected growth rate is too high for a stable firm, the value obtained using the stable-growth FCFE model will be extremely high.

(Module 21.1, LOS 21.a)

**Related Material**

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**79. (B) \$17.00.****Explanation**

$FCFE = CFO - FCInv + \text{net borrowing} = \$49.50 - \$40.00 + \$7.50 = \$17.00$

(Module 21.4, LOS 21.d)

**Related Material**

[SchweserNotes - Book 3](#)

CFA<sup>®</sup>**80. (A) Free cash flows to firm (FCFF).****Explanation**

The FCFFs are normally unaffected by the changes in leverage, as these are the cash flows before the debt payments.

(Module 21.5, LOS 21.f)

**Related Material**

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**81. (A) \$87.50.****Explanation**

Terminal value = FCFE / (k – g) = \$5.25 / (0.11 – 0.05) = \$87.50

(Module 21.5, LOS 21.i)

**Related Material**

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**82. (B) growth is currently high and will move through a transitional stage to a steady-state growth rate.****Explanation**

The three-stage model using either FCFE or FCFF typically assumes that growth is currently high and will move through a transitional stage to a steady-state growth rate. Multi-stage models assume that the required rate of return exceeds the growth rate in the last stage.

(Module 21.5, LOS 21.j)

**Related Material**

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**83. (A) an increase in value due to interest tax shields.****Explanation**

The amount of financial leverage used by a firm will affect its value. For small amounts of leverage, the additional bankruptcy risk will be low, and will be more than offset by the additional value of interest tax shields.

(Module 21.5, LOS 21.f)

**Related Material**

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**84. (C) \$6.90.****Explanation**

In year 5, FCFE = Earnings per share – (Capital Expenditures – Depreciation) (1 – Debt Ratio) – (Change in working capital) (1 – Debt Ratio)

= 8.10 – 0(1 – 0.4) – 2.00(1 – 0.4) = 6.90.

(Module 21.4, LOS 21.d)

**Related Material**

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CFA<sup>®</sup>**85. (A) remain the same.****Explanation**

Share repurchases are a use of free cash flows, not a source. FCFF is cash flow that is available to all capital suppliers. Notice the conspicuous absence of repurchases in the following:  $FCFF = CFO + Int(1 - \text{tax rate}) - FCInv$ .

(Module 21.5, LOS 21.f)

**Related Material**

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**86. (C) \$74.10.****Explanation**

Value of equity =  $\$1.25 / (1.12)^1 + \$1.55 / (1.12)^2 + \$90.00 / (1.12)^2 = \$74.10$

(Module 21.5, LOS 21.k)

**Related Material**

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**87. (C) use changes that are based upon a working capital ratio that is closer to the industry average.****Explanation**

The best solution is to use changes that are based upon a working capital ratio that approximates the industry average. The problem will not be eliminated by switching to a three-stage FCFE model.

(Module 21.1, LOS 21.a)

**Related Material**

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**88. (B) the firm capital structure is static.****Explanation**

A firm's target debt ratio is usually assumed to remain constant. Historical cash flows are generally projected forward with a growth rate.

(Module 21.5, LOS 21.e)

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**89. (C) control.****Explanation**

Dividend policy can be changed by the buyer of a firm. Thus, the free cash flow perspective looks to the source of dividends in a position of control rather than directly at dividends.

(Module 21.1, LOS 21.b)

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CFA<sup>®</sup>**90. (C) \$200,000.****Explanation**

Brown's cash flow from operations (CFO) was \$800,000 = (\$900,000 Net Income + \$300,000 depreciation - \$400,000 gain).

Capital expenditure cash flows were -\$3,000,000 for the factory and \$2,400,000 cash received from sale of the old equipment for a net outflow of cash of \$600,000.

\$200,000 = (\$800,000 - \$600,000).

(Module 21.3, LOS 21.c)

**Related Material**

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**91. (A) increase because the weighted average cost of capital will be lower due to interest tax shields.****Explanation**

When a firm adds leverage, its value may increase due to the tax shields on interest expense and the generally lower cost of debt. In theory, there is an optimal capital structure. If the amount of debt employed is greater than the optimal, the costs associated with risk of bankruptcy or financial distress begin to outweigh the advantage of interest tax shields.

(Module 21.5, LOS 21.f)

**Related Material**

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**92. (B) Two-stage FCFF model.****Explanation**

The two-stage FCFF model is most suited for analyzing firms growing at a rate faster than the overall economy. The two-stage model assumes a high rate of growth for an initial period, followed by an immediate jump to a constant, stable growth rate.

(Module 21.5, LOS 21.j)

**Related Material**

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**93. (B) FCFs track profitability closely over the analyst's forecast horizon.****Explanation**

FCF approaches are best when those flows are a good indication of a firm's profitability the analyst's forecast horizon.

(Module 21.1, LOS 21.a)

**Related Material**

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94. (A) \$3.39.

**Explanation**

FCFE = Earnings per share – (Capital Expenditures – Depreciation) (1 – Debt Ratio) – Change in working capital (1 – Debt Ratio) = 5.00 – (2.40 – 1.80)

$(1 - 0.3) - (1.7)(1 - 0.3) = 3.39.$

(Module 21.5, LOS 21.e)

**Related Material**

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95. (A) The forecast of working capital as a percentage of revenues in the stable growth period is not large enough to maintain the long-term sustainable growth rate.

**Explanation**

The larger the estimate of working capital as a percentage of revenues, the larger the investment in net working capital, and the lower the FCFE in the stable period. A low stable-period FCFE estimate will result in a low estimate of value today. The solution is to use a working capital ratio closer to the long-run industry average.

If the cost of equity estimate in the stable growth period is too high, the terminal value will be too low. Because the terminal value typically makes up a large portion of the current value, this will cause the current value estimate to be too low. The solution is to use a cost of equity estimate based on a beta of one.

If earnings are temporarily depressed, all the FCFE estimates will be low, and the current value estimate will be low. The solution is to use an estimate of long-run normalized earnings.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

The following information was collected from the financial statements of Hiller GmbH, a German consulting company, for the year ending December 31, 2013:

- Earnings per share = €4.50.
- Capital Expenditures per share = €3.00.
- Depreciation per share = €2.75.
- Increase in working capital per share = €0.75.
- Debt financing ratio = 30.0%.
- Cost of equity = 12.0%.
- Cost of debt = 6.0%.
- Tax rate = 30.0%.
- Outstanding shares = 100 million.
- New debt borrowing = €15.0 million.
- Debt repayment = €30.0 million.
- Interest expense = €7.1 million.

The financial leverage for the firm is expected to be stable. Hiller uses IFRS accounting standards and records interest expense as cash flow from financing (CFF).

Two analysts are valuing Hiller stock; both are basing their analysis on FCFE approaches.

**Analyst #1** remarks: "Hiller is a relatively mature company; a constant growth model is the better approach."

**Analyst #1** estimates FCFE based on the information above and a growth rate of 5.0%.

**Analyst #2** states: "Hiller just acquired a rival that should change their growth pattern. I think a three stage growth model based on industry growth patterns should be used."

**Analyst #2** estimates FCFE per share as €3.85. Growth rate estimates are listed below, and from year 7 and thereafter the estimated growth rate is 3.0%.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7+
Growth rates	12.5%	12.5%	12.5%	8.0%	6.5%	5.0%	3.0%

96. (B) €3.80.

**Explanation**

Base-year FCFE = EPS – (capital expenditures – depreciation) x (1 – debt ratio) – increase in working capital x (1 – debt ratio) = €4.50 – (€3.00 – €2.75) (1 – 0.30) – €0.75(1 – 0.30) = €3.80.

(Module 21.5, LOS 21.e)

**Related Material**

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97. (C) €57.00.

**Explanation**

Value per share = (€3.80 x 1.05) / (0.12 – 0.05) = €57.00.

(Module 21.5, LOS 21.e)

**Related Material**

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98. (C) €82.40.

**Explanation**

Estimates for the future FCFE based on supplied growth rates are:

Year	0	1	2	3	4	5	6	7
Growth rate		12.5%	12.5%	12.5%	8.0%	6.5%	5.0%	3.0%
FCFE/share	€3.850	€4.331	€4.873	€5.482	€5.893	€6.335	€6.620	€6.818

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Terminal value year 6 =  $6.818 / (12.0\% - 3.0\%) = €75.76$

The nominal cash flow for year 6 is  $€75.76 + €6.62 = €82.38$ , which is the terminal cash flow plus the FCFE value for the year.

(Module 21.5, LOS 21.e)

**Related Material**

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99. (A) **€60.70.**

**Explanation**

Year	0	1	2	3	4	5	6	7
Growth rate		12.5%	12.5%	12.5%	8.0%	6.5%	5.0%	3.0%
FCFE/share	€3.850	€4.331	€4.873	€5.482	€5.893	€6.335	€6.620	€6.818

Terminal value year 6 =  $6.818 / (12.0\% - 3.0\%) = €75.76$

For the calculator find NPV: CFO = 0, CF1 = €4.33, CF2 = €4.87, CF3 = €5.48, CF4 = €5.89, CF5 = €6.34, CF6 = €82.38, I/Y = 12. The result is €60.73.

(Module 21.5, LOS 21.e)

**Related Material**

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100. (A) **present value (PV) of FCFE during the extraordinary growth period plus the PV of terminal value.**

**Explanation**

The value of stock under the two-stage FCFE model will be equal to the present value of FCFE during the extraordinary growth period plus the present value of the terminal value at the end of this period.

(Module 21.5, LOS 21.k)

**Related Material**

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101. (C) **Two-stage free cash flow to equity (FCFE).**

**Explanation**

The two-stage FCFE model is well suited to value a firm that is currently experiencing high growth and will likely see this growth drop to a lower, more stable rate in the future.

(Module 21.5, LOS 21.j)

**Related Material**

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CFA<sup>®</sup>**102. (B) The value will decrease.****Explanation**

Everything else being constant, an increase in the relevant required rate of return should decrease the value of the firm.

(Module 21.5, LOS 21.i)

**Related Material**

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**103. (C) increase due to the additional value of interest tax shields.****Explanation**

For small changes in leverage, the additional value added by the interest tax shields will more than offset the additional risk of bankruptcy / financial distress. Given the tax advantage of debt, the firm's WACC should decline, not increase with small changes in leverage.

(Module 21.5, LOS 21.f)

**Related Material**

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**104. (C) \$5.90.****Explanation**

$FCFF = EPS + \text{net non-cash charges} + \text{after-tax interest} - FCInv - WCInv$

$FCFF = \$4.00 + 3.00 + \$2.40 - \$2.00 - 1.50 = \$5.90$

(Module 21.4, LOS 21.d)

**Related Material**

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**105. (C) after-tax EBIT plus non-cash charges.****Explanation**

The answer is indicated by the definition of FCFF:  $FCFF = EBIT (1 - \text{tax rate}) + \text{Dep} - FCInv - WCInv$ , which assumes that depreciation is the only non-cash charge. Further:  $FCFF = NI + NCC + \text{Int} (1 - \text{tax rate}) - FCInv - WCInv$ .

(Module 21.5, LOS 21.h)

**Related Material**

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Harrisburg Tire Company (HTC) forecasts the following for 2013:

- Earnings (net income) = \$600M.
- Dividends = \$120M.
- Interest expense = \$400M.
- Tax rate = 40.0%.
- Depreciation = \$500M.
- Capital spending = \$800M.

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- Total assets = \$10B (book value and market value).
- Debt = \$4B (book value and market value).
- Equity = \$6B (book value and market value).
- Target debt to asset ratio = 0.40.
- Shares outstanding = 2.0 billion

The firm's working capital needs are negligible, and HTC plans to continue to operate with the current capital structure. The tire industry demand is highly dependent on demand for new automobiles. Individual companies in the industry don't have much influence on the design of automobiles and have very little ability to affect their business environment. The demand for new automobiles is highly cyclical but demand forecast errors tend to be low.

106. (B) 8.0%.

**Explanation**

The firm's estimated earnings growth rate is the product of its retention ratio and ROE:

$$g = RR \times (ROE) = [(600 - 120) / 600] \times (600 / 6000) = 0.08$$

(Module 21.5, LOS 21.k)

**Related Material**

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107. (C) \$420M.

**Explanation**

Since working capital needs are negligible, the free cash flow to equity is:

$$FCFE = \text{Net income} - [1 - DR] \times [\text{FCInv} - \text{Depreciation}] - [(1 - DR) \times \text{WCInv}]$$

$$FCFE = 600M - [1 - 0.4] \times (800M - 500M) = 420M$$

where:

DR = target debt to asset ratio

(Module 21.5, LOS 21.k)

**Related Material**

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108. (B) 15.0%.

**Explanation**

Value of equity =  $FCFE_1 / (\text{Cost of equity} - \text{growth rate})$ ; so  $\$6,000 = [\$420 / (\text{Cost of equity} - 0.08)]$

$$(\text{Cost of equity} - 0.08) \times \$6,000 = \$420$$

$$\text{Cost of equity} - 0.08 = 0.07$$

$$\text{Cost of equity} = 0.15 = 15.0\%$$

(Module 21.5, LOS 21.k)

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109. (C) 11.74%.

**Explanation**

Cost of equity =  $r_f + (r_m - r_f) = 0.05 + 1.056(0.10) = 0.05 + 0.1056 = 0.1556$

The best approximation for cost of debt is the interest expense divided by the market value of the debt.

Cost of debt = Interest expense/market value of debt = \$400 million/\$4.0 billion = 0.10

WACC =  $w_d \times r_d \times (1 - t) + w_e \times r_e = 0.40 \times 0.10 \times (1 - 0.40) + 0.60 \times 0.1556 = 0.1174$  (Module 21.5, LOS 21.k)

**Related Material**

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110. (B) are in an industry with significant barriers to entry.

**Explanation**

The two-stage FCFE model is suitable for valuing firms in industries with significant barriers to entry. Where these are present it is possible for the firm to maintain a high growth rate during an initial phase of low competition, and that the rate will drop sharply to a normalized rate when competition ultimately appears.

(Module 21.5, LOS 21.j)

**Related Material**

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111. (A) \$540M.

**Explanation**

The free cash flow to the firm is:

FCFF = Net income + (Interest expense)(1 - T) - Capital expenditures + Depreciation  
 $600M + 400M(1 - 0.40) - 800M + 500M = 540M$

(Module 21.4, LOS 21.d)

**Related Material**

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112. (B) \$1,077M.

**Explanation**

The value of the firm's equity is equal to the value of the firm minus the value of the debt. Firm value =  $\$80M \times 1.03 / (0.10 - 0.03) = \$1,177M$ , so equity value is  $\$1,177M - \$100M = \$1,077M$ .

(Module 21.5, LOS 21.k)

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113. (C) FCFE is greater than dividends, and the excess is not invested in zero NPV projects.

**Explanation**

The estimate of value from FCFE models will always be different from the value obtained using DDM, if the FCFE is greater than dividends, and the excess cash is not invested in zero NPV projects.

(Module 21.5, LOS 21.g)

**Related Material**

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114. (C) significantly higher than that of the overall economy.

**Explanation**

The two-stage FCFF model is more useful in valuing a firm that is growing at a rate significantly higher than the overall economy. Since this cannot persist indefinitely, growth will eventually slow to a stable growth rate consistent with that of the economy.

(Module 21.5, LOS 21.j)

**Related Material**

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115. (A) the firm's cost of capital.

**Explanation**

The optimal capital structure is the mix of debt and equity that will maximize the value of the firm and minimize weighted average cost of capital (i.e. the firm's cost of capital or "WACC").

(Module 21.5, LOS 21.f)

**Related Material**

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The following information was collected from the financial statements of Bankers Industrial Corp (BIC) for the year ended December 31, 2013.

- Earnings before interest and taxes (EBIT) = \$6.00 million.
- Capital expenditures = \$1.25 million.
- Depreciation expense = \$0.63 million.
- Working capital additions = \$0.59 million.
- Cost of debt = 10.50%.
- Cost of equity = 16.00%.
- Stable growth rate for FCFF = 7.00%.
- Stable growth rate for FCFE = 10.00%.



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- Market value of debt = \$20.00 million.
- Book value of debt = \$22.50 million.
- Outstanding shares = 500,000.
- Interest expense = \$2.00 million.
- New Debt borrowing = \$3.30 million.
- Debt repayment = \$2.85 million.
- Growth rates for two-stage growth model for FCFE:
  - 25.0% for Years 1–3.
  - 6.0% for Years 4 and thereafter.

BIC is currently operating at their target debt ratio of 40.00%. The firm's tax rate is 40.00%.

116. (A) **\$2.39 million.**

**Explanation**

The FCFF for the current year is  $[\$6.00\text{m} \times (1 - 0.40)] + \$0.63\text{m} - \$1.25\text{m} - \$0.59\text{m} = \$2.39\text{m}$ .

(Module 21.5, LOS 21.k)

**Related Material**

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117. (A) **\$50 million.**

**Explanation**

The value of BIC using a stable-growth FCFF model is \$49.95 million, calculated as:

$$\text{FCFF} = [\$6.00\text{m} \times (1 - 0.40)] + \$0.63\text{m} - \$1.25\text{m} - \$0.59\text{m} = \$2.39\text{m}$$

$$\text{WACC} = (0.60 \times 0.16) + [0.40 \times 0.105 \times (1 - 0.40)] = 12.12\%$$

$$\text{Estimated value} = (\$2.39\text{m} \times 1.07) / (0.1212 - 0.07) = \$49.95 \text{ million.}$$

(Module 21.5, LOS 21.k)

**Related Material**

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118. (C) **\$61.**

**Explanation**

$$\text{FCFE} = \text{FCFF} - \text{Interest expense} \times (1 - \text{tax rate}) + \text{Net borrowing} = \$2.40 \text{ million} - [\$2.00 \text{ million} \times (1 - 0.40)] + \$3.30 \text{ million} - \$2.85 \text{ million} = \$1.65 \text{ million.}$$

$$\text{The value of equity is: } [\$1.65 \text{ million} \times (1 + 0.10)] / (0.16 - 0.10) = \$30.25 \text{ million.}$$

$$\text{On a per share basis: } \$30.25 \text{ million} / 500,000 = \$60.50$$

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

**119. (A) overvalued.**

**Explanation**

FCFE = FCFF – Interest expense x (1 – T) + New borrowing.

Year	0	1	2	3	4
Growth rate		25.0%	25.0%	25.0%	6.0%
FCFE in mil\$	\$1.750	\$2.188	\$2.732	\$3.418	\$3.623

The terminal value is  $\$3,623 / (0.16 - 0.06) = \$36,230$  million. The calculator inputs: CFO = 0, CF1 = \$2,188, CF2 = \$2,734, CF3 = \$3,418 + \$36,230 = \$39,648, I = 16, NPV = \$29.319 million.

Per share price is  $\$29,319,000 / 500,000 = \$58.64$ . The stock appears to be overvalued at the current market price of \$62.50 per share, as our estimated value of \$58.64 suggests that the market price is too high.

(Module 21.5, LOS 21.k)

**Related Material**

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William Bolton is an avid disc golf player and the owner of Deep in the Game Discs (DITGD), a business involved in wholesale distribution of discs and other disc golf equipment. DITGD supplies smaller outlets within the U.S. market and exports overseas. Will has built his business organically over a 20-year period, starting as a hobby but developing into a mid-sized business.

Will has recently lost some UK export customers to a smaller UK located competitor called Fishy Discs Ltd. Will recently met Neil Prebble, the owner of Fishy Discs at a trade fair and was considering a friendly acquisition in order to expand his business into the UK market.

Will has employed an accountancy firm with a corporate finance division, to give him some indication of a price to offer for Fishy Discs: 'W

**Exhibit 1: Fishy Discs—Selected Financial Information**

Income Statement Period Ended 31st December 20x9		
	£	£
Sales revenue		200,000
Expenses:		
Cost of goods sold	80,000	
Salaries	10,000	
Depreciation	140,000	

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Interest	1,000	105,000
		95,000
Gain from sale of PP&E		20,000
Pre-tax income		115,000
Provision for taxes		40,000
Net income		75,000

Balance Sheet Year Ended 20x9		
	20x8	20x9
	£	£
<b>Current Assets</b>		
Cash	18,000	66,000
Accounts receivable	18,000	20,000
Inventory	14,000	10,000
<b>Non-Current Assets</b>		
Gross PP&E	282,000	312,000
Accumulated depreciation	(80,000)	(84,000)
<b>Total Assets</b>	<b>252,000</b>	<b>324,000</b>
<b>Current Liabilities</b>		
Accounts payable	10,000	18,000
Salaries payable	16,000	9,000
Interest payable	6,000	7,000
Taxes payable	8,000	10,000
Dividends payable	2,000	12,000
<b>Non-Current Liabilities</b>		
Long term debt	20,000	30,000
Deferred tax	30,000	40,000
<b>Stockholders' Equity</b>		
Contributed capital	100,000	80,000
Retained earnings	60,000	118,000
<b>Liabilities and Equity</b>	<b>252,000</b>	<b>324,000</b>

On review of the PP&E footnote disclosure, it is discovered that equipment with a carrying value of £10,000 had been disposed of during 20x9.

All long-term debt is issued with a coupon such that the debt will trade at par value on issuance.

The effective tax rate relating to Fishy Discs is 40%.

Deferred tax liabilities are not expected to reverse for the foreseeable future.

The corporate finance firm employed by Will has decided to value Fishy Discs based on sustainable free cash flow, after removing one off items from the cash flow statement. In addition, they have considered how long Fishy Discs will be able to maintain its cash flow growth rates. Fishy Discs currently is the only domestically located UK supplier of disc golf equipment. Their results are included in Exhibit 2.

**Exhibit 2: Fishy Discs Ltd. Valuation Data**

Free cash flow to the firm (base period estimate)	£75,000
High growth rate	2%
Sustainable growth rate	4%
Duration of high growth	4 years
Declining growth duration	6 years
Cost of equity	10%
WACC	8%

The corporate finance team believes the market value Fishy Discs debt is close to book value in the 20x9 account. The team believes that the decline in growth from 12% down to 4% will be linear.

Tony Cermak is a young modeler in the corporate finance team and he has raised a couple of comments regarding the valuation figures prepared for Fishy Discs.

**Concern 1:** Fishy Discs reduced its inventory between 20x8 and 20x9. This led to a boost of £4,000 in cash flows in 20x9. Given inventory, levels cannot decline below zero and we are forecasting Fishy Discs to grow, any boost to cash flow from inventory reduction is likely to be transitory and should be removed from sustainable cash flow.

**Concern 2:** Fishy Discs current high growth rates are linked to an exclusivity agreement that Prebble has with a U.S. disc producer. This agreement gives Fishy Discs sole supplier status for the global number one selling brand in the UK for a four-year period. At the end of this period, the U.S. supplier has indicated that other firms will be allowed to import and retail these products in the UK market. Given this, I believe our growth rate assumptions detailed in Exhibit 2 are unrealistic.

Tony has been given the firms free cash flow valuation model guide to study before he attempts to value Fishy Discs. In particular, he is interested in the following formulas that have been given:

**Exhibit 3: Cash Flow Valuation Guide Extract**

FCFF from EBIT:

$$FCFF = EBIT(1 - T) + \text{depreciation} - FC_{INV} - WCI_{INV}$$

FCFF from EBITDA:

$$FCFF = EBITDA(1 - T) + \text{depreciation} - FC_{INV} - WCI_{INV}$$

120. (C) £85,000.

**Explanation**

$$CFO = NI + NCC - WCINv$$

Non-Cash Charges	
+ Depreciation	14,000
– Gain on asset disposal	(20,000)
+ ΔDeferred tax liability	10,000
Net impact	4,000

Working Capital Investment		
	20x9	20x8
CA – cash and investments	30,000	32,000
CL – debt instruments and dividends payables	44,000	40,000
Working capital	(14,000)	(8,000)
Δ in working capital	– £6,000	

Note that the change in the deferred tax liability (DTL) is only included, as it is not expected to reverse. A DTL that is expected to reverse in the near term would be ignored. Whilst the DTL represents a boost to operating cash flows when it is created, it will reduce cash flows when it reverses. These two cash flow effects off set and as a result, it is best to ignore the DTL when estimating free cash flow if it is expected to reverse in the short run.

$$CFO = 75,000 + 4,000 + 6,000 = £85,000$$

(Module 21.4, LOS 21.d)

**Related Material**

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121. (A) £20,000.

**Explanation**

$FC_{INV} = \text{change in carrying value} + \text{dep}^n \text{ expense} - \text{gain on disposal}$

$$FC_{INV} = 26,000 + 14,000 - 20,000 = 20,000$$

Alternatively

Compute additions to PP&E as a residual figure:

**FC<sub>INV</sub> computation**

PP&E 20x8	202,000	Proceeds (plug)	30,000
Depreciation	(14,000)	Carrying value	(10,000)
Disposal	(10,000)	Gain/(loss)	20,000
Additions (plug)	50,000		
PP&E 20x9	228,000		
$FC_{INV} = £50,000 - £30,000 = £20,000$			

Note that additions and proceeds have been computed as residual (balancing) figures.

(Module 21.4, LOS 21.d)

**Related Material**

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122. (A) £55,600.

**Explanation**

$$FCFF = CFO + \text{interest} (1 - T) - FC_{INV}$$

$$FCFF = £75,000 + £1,000 (1 - 0.4) - £20,000 = £55,600$$

(Module 21.4, LOS 21.d)

**Related Material**

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123. (B) £3,075,000.

**Explanation**

$$CF_2 = £94,080$$

$$CF_3 = £105,370$$

$$CF_4 = £118,014 + £708,084 + £3,068,364$$

$$I = 8 \text{ CPT} \rightarrow NPV = £3,104,628$$

$$\text{Firm value} = £3,104,628$$

$$\text{Equity value} = \text{firm value} - \text{debt value}$$

$$£3,074,628 = £3,104,628 - £30,000$$

(Module 21.5, LOS 21.k)

**Related Material**

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CFA<sup>®</sup>**124. (A) Both.****Explanation**

**Concern 1:** He is correct that declines in inventory give one off boosts to cash flow from operations and hence free cash flow. In addition, it is unlikely that Fishy Discs inventory will decline in future periods given we are expecting growth of 12% in the near term.

**Concern 2:** The corporate finance firm are using a three-stage model with declining growth after four years. The model takes six years for growth to decline to sustainable levels. Given that Fishy Discs will lose its exclusivity agreement with the U.S. producer in four years, it is likely that the decline in growth will be far more rapid. Once barriers to entry are removed growth will decline from 12% to 4% far more rapidly than is being modelled. For companies that sustain economic profit due barriers to entry such as patents, copyrights and other agreements using a two stage model may model the decline in growth due to an influx in competition more accurately.

(Module 21.5, LOS 21.j)

**Related Material**[SchweserNotes - Book 3](#)**125. (C) Only FCFF from EBIT.****Explanation**

$$\text{FCFF} = \text{EBITDA}(1 - T) + (D \times T) - \text{FC}_{\text{INV}} - \text{WC}_{\text{INV}}$$

Note that the formulae given in the question is incorrect as it adds back depreciation rather than the tax shield on depreciation. It should be noted that other NCC might need to be adjusted for in practice.

(Module 21.5, LOS 21.h)

**Related Material**[SchweserNotes - Book 3](#)**126. (B) a constant growth model's price as of the beginning of the last stage.****Explanation**

Terminal values are usually calculated as the present value of the price produced by a constant-growth model as of the beginning of the last stage.

(Module 21.5, LOS 21.l)

**Related Material**[SchweserNotes - Book 3](#)

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**127. (B) have capital expenditures that are not significantly higher than depreciation.**

**Explanation**

The stable-growth FCF model is useful for valuing firms that are expected to have growth rates close to that of the overall economy. Since the rate of growth approximates that for the overall economy, these firms should have capital expenditures that are not significantly different than depreciation.

(Module 21.5, LOS 21.j)

[SchweserNotes - Book 3](#)

**128. (C) FCFE divided by the total of required rate on equity minus growth.**

**Explanation**

Terminal values are usually calculated as the present value of the price produced by a constant-growth model as of the beginning of the last stage, which is  $FCFE / (\text{required rate on equity} - \text{growth})$ .

(Module 21.5, LOS 21.i)

**Related Material**

[SchweserNotes - Book 3](#)

An analyst has prepared the following scenarios for Schneider Inc.:

**Scenario 1 Assumptions:**

- Tax Rate is 40%.
- Weighted average cost of capital (WACC) = 12.0%.
- Constant growth rate in free cash flow (FCF) = 3.0%.
- Year 0, free cash flow to the firm (FCFF) = \$30.0 million
- Target debt ratio = 10.0%.

**Scenario 2 Assumptions:**

- Tax Rate is 40.0%.
- Expenses before interest and taxes (EBIT), capital expenditures, and depreciation will grow at 20.0% for the next three years.
- After three years, the growth in EBIT will be 2.0%, and capital expenditure and depreciation will offset each other.
- Weighted average cost of capital (WACC) = 12.0%
- Target debt ratio = 10.0%.

Scenario 2 FCFF (in \$ millions)	Year 0	Year 1	Year 2	Year 3	Year 4
EBIT	\$45.00	\$54.00	\$64.80	\$77.76	\$79.70
Capital Expenditures	18.00	21.60	25.92	31.10	
Depreciation	12.00	14.40	17.28	20.74	
Change in Working Capital	6.00	6.30	6.60	7.20	7.20
FCFF		18.90	23.64	29.09	40.62



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Other financial items for Schneider Inc.:

Estimated market value of debt = \$35.0 million

Cost of debt = 5.0%

Shares outstanding = 20 million.

129. (A) **\$343 million.**

**Explanation**

Under the stable growth FCFF model, the value of the firm =  $FCFF_1 / (WACC - g_n)$   
 = \$30 million x (1.03) / (0.12 - 0.03) = \$343.33 million.

(Module 21.5, LOS 21.k)

**Related Material**

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130. (B) **\$346 million.**

**Explanation**

The value of the firm is the present value of Year 1-3 plus the terminal value. The terminal value is:  $FCFF \text{ for year 4} / (WACC - \text{growth rate}) = \$40.62 / (0.12 - 0.02) = \$406.22$  million in terms of year 3 dollars. The calculator inputs to solve NPV for the value of the firm is: CFO = \$0, CF1 = \$18.90, CF2 = \$23.64, CF3 = \$29.09 + \$406.22 = \$435.31, I = 12. NPV = \$345.57 million.

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

131. (A) **13.0%.**

**Explanation**

The weighted average cost of capital formula is  $WACC = w_d \times r_d \times (1 - t) + w_e \times r_e$ .  
 The weight of debt is 10.0% – the weight of equity must be 90.0%.

$$0.12 = 0.10 \times 0.05 \times (1 - 0.40) + 0.90 \times r_e$$

$$0.120 - 0.003 = 0.90 \times r_e$$

$$0.117 / 0.9 = r_e$$

$$r_e = 13.0\%$$

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

**132. (C) \$15.75 per share**

**Explanation**

The estimated market value of debt is \$35 million, which represents 10.0% of the value of the firm. The other 90.0% is the value of equity or \$315 million. \$315 million/20 million shares = \$15.75 per share.

(Module 21.5, LOS 21.k)

**Related Material**

[SchweserNotes - Book 3](#)

**133. (C) growing at a rate similar or less than the nominal growth rate of the economy.**

**Explanation**

Companies growing at a rate similar to or less than the nominal growth rate of the economy are best suited for the Stable Growth FCFE Model. The three-stage FCFE model is most suited to analyzing firms currently experiencing high growth that will face increasing competitive pressures over time, leading to a gradual decline in growth to a stable level. The two-stage model is best suited to analyzing firms in a high growth phase that will maintain that growth for a specific period, such as firms with patents or firms in an industry with significant barriers to entry.

(Module 21.5, LOS 21.j)

**Related Material**

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**134. (A) in high growth industries that will face increasing competitive pressures over time, leading to a gradual decline in growth to a stable level.**

**Explanation**

The three-stage FCFE model, or E-Model, is most suited to analyzing firms currently experiencing high growth that will face increasing competitive pressures over time, leading to a gradual decline in growth to a stable level. The two-stage model is best suited to analyzing firms in a high growth phase that will maintain that growth for a specific period, such as firms with patents or firms in an industry with significant barriers to entry. Companies growing at a rate similar to or less than the nominal growth rate of the economy are best suited for the Stable Growth FCFE Model. A firm that pays out all of its earnings as dividends will have a growth rate of zero (remember  $g = RR \times ROE$ ) and would not be valued using the three-stage

(Module 21.5, LOS 21.j)

**Related Material**

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CFA<sup>®</sup>**135. (B) \$750M.****Explanation**

The value of the firm's equity is:  $\$50M \times 1.05 / (0.12 - 0.05) = \$750M$

(Module 21.5, LOS 21.k)

**Related Material**

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**136. (C) Cost of equity.****Explanation**

Free cash flow to equity valuation uses the opportunity cost relevant to stockholders, which is the cost of equity.

(Module 21.1, LOS 21.a)

**Related Material**

[SchweserNotes - Book 3](#)

**137. (B) net income plus non-cash charges plus after-tax interest.****Explanation**

The answer is indicated by the definition of FCFF:  $FCFF = NI + NCC + Int(1 - tax\ rate) -$

$FCInv - WCInv$ . The relationship between net income and FCFF is indicated by:  $NI = EBIT(1 - tax\ rate) - Int(1 - tax\ rate)$ .

(Module 21.5, LOS 21.h)

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