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PRACTICE PROBLEMS

1 Corporate governance:
   - **A** complies with a set of global standards.
   - **B** is independent of both shareholder theory and stakeholder theory.
   - **C** seeks to minimize and manage conflicting interests between insiders and external shareholders.

2 Which group of company stakeholders would be *least* affected if the firm's financial position weakens?
   - **A** Suppliers
   - **B** Customers
   - **C** Managers and employees

3 Which of the following represents a principal–agent conflict between shareholders and management?
   - **A** Risk tolerance
   - **B** Multiple share classes
   - **C** Accounting and reporting practices

4 Which of the following issues discussed at a shareholders' general meeting would *most likely* require only a simple majority vote for approval?
   - **A** Voting on a merger
   - **B** Election of directors
   - **C** Amendments to bylaws

5 Which of the following statements regarding stakeholder management is *most* accurate?
   - **A** Company management ensures compliance with all applicable laws and regulations.
   - **B** Directors are excluded from voting on transactions in which they hold material interest.
   - **C** The use of variable incentive plans in executive remuneration is decreasing.

6 Which of the following represents a responsibility of a company's board of directors?
   - **A** Implementation of strategy
   - **B** Enterprise risk management
   - **C** Considering the interests of shareholders only

7 Which of the following statements about non-market factors in corporate governance is *most* accurate?
   - **A** Stakeholders can spread information quickly and shape public opinion.
   - **B** A civil law system offers better protection of shareholder interests than does a common law system.
   - **C** Vendors providing corporate governance services have limited influence on corporate governance practices.

8 Which of the following statements regarding corporate shareholders is *most* accurate?
   - **A** Cross-shareholdings help promote corporate mergers.

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B Dual-class structures are used to align economic ownership with control.

C Affiliated shareholders can protect a company against hostile takeover bids.

9 Which of the following statements about environmental, social, and governance (ESG) in investment analysis is correct?

A ESG factors are strictly intangible in nature.

B ESG terminology is easily distinguishable among investors.

C Environmental and social factors have been adopted in investment analysis more slowly than governance factors.

10 Which of the following statements regarding ESG implementation methods is *most accurate*?

A Negative screening is the most commonly applied method.

B Thematic investing considers multiple factors.

C Relative/best-in-class screening excludes industries with unfavorable ESG aspects.

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SOLUTIONS

1 C is correct. Corporate governance is the arrangement of checks, balances, and incentives a company needs to minimize and manage the conflicting interests between insiders and external shareholders.

2 B is correct. Compared with other stakeholder groups, customers tend to be less concerned with, and affected by, a company's financial performance.

3 A is correct. Shareholder and manager interests can diverge with respect to risk tolerance. In some cases, shareholders with diversified investment portfolios can have a fairly high risk tolerance because specific company risk can be diversified away. Managers are typically more risk averse in their corporate decision making to better protect their employment status.

4 B is correct. The election of directors is considered an ordinary resolution and, therefore, requires only a simple majority of votes to be passed.

5 B is correct. Often, policies on related-party transactions require that such transactions or matters be voted on by the board (or shareholders), excluding the director holding the interest.

6 B is correct. The board typically ensures that the company has an appropriate enterprise risk management system in place.

7 A is correct. Social media has become a powerful tool for stakeholders to instantly broadcast information with little cost or effort and to compete with company management in influencing public sentiment.

8 C is correct. The presence of a sizable affiliated stockholder (such as an individual, family trust, endowment, or private equity fund) can shield a company from the effects of voting by outside shareholders.

9 C is correct. The risks of poor corporate governance have long been understood by analysts and shareholders. In contrast, the practice of considering environmental and social factors has been slower to take hold.

10 A is correct. Negative screening, which refers to the practice of excluding certain sectors, companies, or practices that violate accepted standards in such areas as human rights or environmental concerns, is the most common ESG investment style.

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PRACTICE PROBLEMS

1 The net present value (NPV) of an investment is equal to the sum of the expected cash flows discounted at the:

A internal rate of return.

B risk-free rate.

C opportunity cost of capital.

2 A $2.2 million investment will result in the cash flows shown below:

Year	Year-End Cash Flow (millions)
1	$1.3
2	$1.6
3	$1.9
4	$0.8

Using an 8% opportunity cost of capital, the project's net present value (NPV) is *closest* to:

A $2.47 million.

B $3.40 million.

C $4.67 million.

3 The internal rate of return (IRR) is *best* described as the:

A opportunity cost of capital.

B time-weighted rate of return.

C discount rate that makes the net present value equal to zero.

4 A three-year investment requires an initial outlay of £1,000. It is expected to provide three year-end cash flows of £200 plus a net salvage value of £700 at the end of three years. Its internal rate of return (IRR) is *closest* to:

A 10%.

B 11%.

C 20%.

5 Given the following cash flows for a capital project, calculate the NPV and IRR. The required rate of return is 8 percent.

Year	0	1	2	3	4	5
Cash flow	–50,000	15,000	15,000	20,000	10,000	5,000

	NPV	IRR
A	$1,905	10.9%
B	$1,905	26.0%
C	$3,379	10.9%

6 Given the following cash flows for a capital project, calculate its payback period and discounted payback period. The required rate of return is 8 percent.

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Year	0	1	2	3	4	5
Cash flow	–50,000	15,000	15,000	20,000	10,000	5,000

The discounted payback period is:

A 0.16 years longer than the payback period.

B 0.51 years longer than the payback period.

C 1.01 years longer than the payback period.

7 An investment of $100 generates after-tax cash flows of $40 in Year 1, $80 in Year 2, and $120 in Year 3. The required rate of return is 20 percent. The net present value is *closest* to:

A $42.22.

B $58.33.

C $68.52.

8 An investment of $150,000 is expected to generate an after-tax cash flow of $100,000 in one year and another $120,000 in two years. The cost of capital is 10 percent. What is the internal rate of return?

A 28.39 percent.

B 28.59 percent.

C 28.79 percent.

9 Kim Corporation is considering an investment of 750 million won with expected after-tax cash inflows of 175 million won per year for seven years. The required rate of return is 10 percent. What is the project's:

	NPV?	IRR?
A	102 million won	14.0%
B	157 million won	23.3%
C	193 million won	10.0%

10 Kim Corporation is considering an investment of 750 million won with expected after-tax cash inflows of 175 million won per year for seven years. The required rate of return is 10 percent. Expressed in years, the project's payback period and discounted payback period, respectively, are *closest* to:

A 4.3 years and 5.4 years.

B 4.3 years and 5.9 years.

C 4.8 years and 6.3 years.

11 An investment of $20,000 will create a perpetual after-tax cash flow of $2,000. The required rate of return is 8 percent. What is the investment's profitability index?

A 1.08.

B 1.16.

C 1.25.

12 Hermann Corporation is considering an investment of €375 million with expected after-tax cash inflows of €115 million per year for seven years and an additional after-tax salvage value of €50 million in Year 7. The required rate of return is 10 percent. What is the investment's PI?

A 1.19.

B 1.33.

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C 1.56.

13 Erin Chou is reviewing a profitable investment project that has a conventional cash flow pattern. If the cash flows for the project, initial outlay, and future after-tax cash flows all double, Chou would predict that the IRR would:

A increase and the NPV would increase.

B stay the same and the NPV would increase.

C stay the same and the NPV would stay the same.

14 Shirley Shea has evaluated an investment proposal and found that its payback period is one year, it has a negative NPV, and it has a positive IRR. Is this combination of results possible?

A Yes.

B No, because a project with a positive IRR has a positive NPV.

C No, because a project with such a rapid payback period has a positive NPV.

15 An investment has an outlay of 100 and after-tax cash flows of 40 annually for four years. A project enhancement increases the outlay by 15 and the annual after-tax cash flows by 5. As a result, the vertical intercept of the NPV profile of the enhanced project shifts:

A up and the horizontal intercept shifts left.

B up and the horizontal intercept shifts right.

C down and the horizontal intercept shifts left.

16 Projects 1 and 2 have similar outlays, although the patterns of future cash flows are different. The cash flows as well as the NPV and IRR for the two projects are shown below. For both projects, the required rate of return is 10 percent.

	Cash Flows						
Year	**0**	**1**	**2**	**3**	**4**	**NPV**	**IRR (%)**
Project 1	–50	20	20	20	20	13.40	21.86
Project 2	–50	0	0	0	100	18.30	18.92

The two projects are mutually exclusive. What is the appropriate investment decision?

A Invest in both projects.

B Invest in Project 1 because it has the higher IRR.

C Invest in Project 2 because it has the higher NPV.

17 Consider the two projects below. The cash flows as well as the NPV and IRR for the two projects are given. For both projects, the required rate of return is 10 percent.

	Cash Flows						
Year	**0**	**1**	**2**	**3**	**4**	**NPV**	**IRR (%)**
Project 1	–100	36	36	36	36	14.12	16.37
Project 2	–100	0	0	0	175	19.53	15.02

What discount rate would result in the same NPV for both projects?

A A rate between 0.00 percent and 10.00 percent.

B A rate between 10.00 percent and 15.02 percent.

C A rate between 15.02 percent and 16.37 percent.

18 Wilson Flannery is concerned that this project has multiple IRRs.

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Year	0	1	2	3
Cash flows	–50	100	0	–50

How many discount rates produce a zero NPV for this project?

A One, a discount rate of 0 percent.

B Two, discount rates of 0 percent and 32 percent.

C Two, discount rates of 0 percent and 62 percent.

19 With regard to the net present value (NPV) profiles of two projects, the cross-over rate is *best* described as the discount rate at which:

A two projects have the same NPV.

B two projects have the same internal rate of return.

C a project's NPV changes from positive to negative.

20 With regard to net present value (NPV) profiles, the point at which a profile crosses the vertical axis is *best* described as:

A the point at which two projects have the same NPV.

B the sum of the undiscounted cash flows from a project.

C a project's internal rate of return when the project's NPV is equal to zero.

21 With regard to net present value (NPV) profiles, the point at which a profile crosses the horizontal axis is *best* described as:

A the point at which two projects have the same NPV.

B the sum of the undiscounted cash flows from a project.

C a project's internal rate of return when the project's NPV is equal to zero.

22 With regard to capital budgeting, an appropriate estimate of the incremental cash flows from a project is *least likely* to include:

A externalities.

B interest costs.

C opportunity costs.

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SOLUTIONS

1 C is correct. The NPV sums the project's expected cash flows (CF) discounted at the opportunity cost of capital. The NPV calculation is

$$\text{NPV} = \sum_{t=0}^{N} \frac{\text{CF}_t}{(1+r)^t}$$

where

CF_t = the expected net cash flow at time t
N = the investment's projected life
r = the discount rate or opportunity cost of capital

2 A is correct.

$$\text{The NPV} = -\$2.2 + \frac{\$1.3}{(1.08)} + \frac{\$1.6}{(1.08)^2} + \frac{\$1.9}{(1.08)^3} + \frac{\$0.8}{(1.08)^4} = \$2.47 \text{ million.}$$

3 C is correct. The internal rate of return is computed by identifying all cash flows and solving for the rate that makes the net present value of those cash flows equal to zero.

4 B is correct. IRR is determined by setting the net present value equal to zero for the cash flows shown in the table.

Year	Cash Flow (£)
0	−1,000
1	200
2	200
3	900

5 C is correct.

$$\text{NPV} = -50{,}000 + \frac{15{,}000}{1.08} + \frac{15{,}000}{1.08^2} + \frac{20{,}000}{1.08^3} + \frac{10{,}000}{1.08^4} + \frac{5{,}000}{1.08^5}$$

$$\text{NPV} = -50{,}000 + 13{,}888.89 + 12{,}860.08 + 15{,}876.64 + 7{,}350.30 + 3{,}402.92$$

$$\text{NPV} = -50{,}000 + 53{,}378.83 = 3{,}378.83$$

The IRR, found with a financial calculator, is 10.88 percent.

6 C is correct.

Year	0	1	2	3	4	5
Cash flow	−50,000	15,000	15,000	20,000	10,000	5,000
Cumulative cash flow	−50,000	−35,000	−20,000	0	10,000	15,000
Discounted cash flow	−50,000	13,888.89	12,860.08	15,876.64	7,350.30	3,402.92
Cumulative DCF	−50,000	−36,111.11	−23,251.03	−7,374.38	−24.09	3,378.83

As the exhibit shows, the cumulative cash flow offsets the initial investment in exactly three years. The payback period is 3.00 years. The discounted payback period is between four and five years. The discounted payback period is 4 years

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plus 24.09/3,402.92 = 0.007 of the fifth year cash flow, or 4.007 = 4.01 years. The discounted payback period is 4.01 – 3.00 = 1.01 years longer than the payback period.

7 B is correct.

$$\text{NPV} = \sum_{t=0}^{3} \frac{\text{CF}_t}{(1+r)^t} = -100 + \frac{40}{1.20} + \frac{80}{1.20^2} + \frac{120}{1.20^3} = \$58.33$$

8 C is correct. The IRR can be found using a financial calculator or with trial and error. Using trial and error, the total PV is equal to zero if the discount rate is 28.79 percent.

		Present Value			
Year	**Cash Flow**	**28.19%**	**28.39%**	**28.59%**	**28.79%**
0	–150,000	–150,000	–150,000	–150,000	–150,000
1	100,000	78,009	77,888	77,767	77,646
2	120,000	73,025	72,798	72,572	72,346
Total		1,034	686	338	–8

A more precise IRR of 28.7854 percent has a total PV closer to zero.

9 A is correct.

$$\text{The NPV} = -750 + \sum_{t=1}^{7} \frac{175}{1.10^t} = -750 + 851.97 = 101.97 \text{ million won.}$$

The IRR, found with a financial calculator, is 14.02 percent. (The PV is –750, N = 7, and PMT = 175.)

10 B is correct.

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cash flow	–750	175	175	175	175	175	175	175
Cumulative cash flow	–750	–575	–400	–225	–50	125	300	475

The payback period is between four and five years. The payback period is four years plus 50/175 = 0.29 of the fifth year cash flow, or 4.29 years.

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cash flow	–750	175	175	175	175	175	175	175
Discounted cash flow	–750	159.09	144.63	131.48	119.53	108.66	98.78	89.80
Cumulative DCF	–750	–590.91	–446.28	–314.80	–195.27	–86.61	12.17	101.97

The discounted payback period is between five and six years. The discounted payback period is five years plus 86.61/98.78 = 0.88 of the sixth year cash flow, or 5.88 years.

11 C is correct.

$$\text{The present value of future cash flows is PV} = \frac{2{,}000}{0.08} = 25{,}000$$

$$\text{The profitability index is PI} = \frac{\text{PV}}{\text{Investment}} = \frac{25{,}000}{20{,}000} = 1.25$$

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12 C is correct.

$$\text{PV} = \sum_{t=1}^{7} \frac{115}{1.10^t} + \frac{50}{1.10^7} = 585.53 \text{ million euros}$$

$$\text{PI} = \frac{585.53}{375} = 1.56$$

13 B is correct. The IRR would stay the same because both the initial outlay and the after-tax cash flows double, so that the return on each dollar invested remains the same. All of the cash flows and their present values double. The difference between total present value of the future cash flows and the initial outlay (the NPV) also doubles.

14 A is correct. If the cumulative cash flow in one year equals the outlay and additional cash flows are not very large, this scenario is possible. For example, assume the outlay is 100, the cash flow in Year 1 is 100 and the cash flow in Year 2 is 5. The required return is 10 percent. This project would have a payback of 1.0 years, an NPV of –4.96, and an IRR of 4.77 percent.

15 A is correct. The vertical intercept changes from 60 to 65 (NPV when cost of capital is 0%), and the horizontal intercept (IRR, when NPV equals zero) changes from 21.86 percent to 20.68 percent.

16 C is correct. When valuing mutually exclusive projects, the decision should be made with the NPV method because this method uses the most realistic discount rate, namely the opportunity cost of funds. In this example, the reinvestment rate for the NPV method (here 10 percent) is more realistic than the reinvestment rate for the IRR method (here 21.86 percent or 18.92 percent).

17 B is correct. For these projects, a discount rate of 13.16 percent would yield the same NPV for both (an NPV of 6.73).

18 C is correct. Discount rates of 0 percent and approximately 61.8 percent both give a zero NPV.

Rate	0%	20%	40%	60%	61.8%	80%	100%
NPV	0.00	4.40	3.21	0.29	0.00	–3.02	–6.25

19 A is correct. The crossover rate is the discount rate at which the NPV profiles for two projects cross; it is the only point where the NPVs of the projects are the same.

20 B is correct. The vertical axis represents a discount rate of zero. The point where the profile crosses the vertical axis is simply the sum of the cash flows.

21 C is correct. The horizontal axis represents an NPV of zero. By definition, the project's IRR equals an NPV of zero.

22 B is correct. Costs to finance the project are taken into account when the cash flows are discounted at the appropriate cost of capital; including interest costs in the cash flows would result in double-counting the cost of debt.

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PRACTICE PROBLEMS

1 The cost of equity is equal to the:
   A expected market return.
   B rate of return required by stockholders.
   C cost of retained earnings plus dividends.

2 Which of the following statements is correct?
   A The appropriate tax rate to use in the adjustment of the before-tax cost of debt to determine the after-tax cost of debt is the average tax rate because interest is deductible against the company's entire taxable income.
   B For a given company, the after-tax cost of debt is generally less than both the cost of preferred equity and the cost of common equity.
   C For a given company, the investment opportunity schedule is upward sloping because as a company invests more in capital projects, the returns from investing increase.

3 Using the dividend discount model, what is the cost of equity capital for Zeller Mining if the company will pay a dividend of C$2.30 next year, has a payout ratio of 30 percent, a return on equity (ROE) of 15 percent, and a stock price of C$45?
   A 9.61 percent.
   B 10.50 percent.
   C 15.61 percent.

4 Dot.Com has determined that it could issue $1,000 face value bonds with an 8 percent coupon paid semi-annually and a five-year maturity at $900 per bond. If Dot.Com's marginal tax rate is 38 percent, its after-tax cost of debt is *closest* to:
   A 6.2 percent.
   B 6.4 percent.
   C 6.6 percent.

5 The cost of debt can be determined using the yield-to-maturity and the bond rating approaches. If the bond rating approach is used, the:
   A coupon is the yield.
   B yield is based on the interest coverage ratio.
   C company is rated and the rating can be used to assess the credit default spread of the company's debt.

6 Morgan Insurance Ltd. issued a fixed-rate perpetual preferred stock three years ago and placed it privately with institutional investors. The stock was issued at $25 per share with a $1.75 dividend. If the company were to issue preferred stock today, the yield would be 6.5 percent. The stock's current value is:
   A $25.00.
   B $26.92.
   C $37.31.

7 A financial analyst at Buckco Ltd. wants to compute the company's weighted average cost of capital (WACC) using the dividend discount model. The analyst has gathered the following data:

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Before-tax cost of new debt	8 percent
Tax rate	40 percent
Target debt-to-equity ratio	0.8033
Stock price	$30
Next year's dividend	$1.50
Estimated growth rate	7 percent

Buckco's WACC is *closest* to:

A 8 percent.

B 9 percent.

C 12 percent.

8 The Gearing Company has an after-tax cost of debt capital of 4 percent, a cost of preferred stock of 8 percent, a cost of equity capital of 10 percent, and a weighted average cost of capital of 7 percent. Gearing intends to maintain its current capital structure as it raises additional capital. In making its capital-budgeting decisions for the average-risk project, the relevant cost of capital is:

A 4 percent.

B 7 percent.

C 8 percent.

9 Fran McClure of Alba Advisers is estimating the cost of capital of Frontier Corporation as part of her valuation analysis of Frontier. McClure will be using this estimate, along with projected cash flows from Frontier's new projects, to estimate the effect of these new projects on the value of Frontier. McClure has gathered the following information on Frontier Corporation:

	Current Year ($)	Forecasted for Next Year ($)
Book value of debt	50	50
Market value of debt	62	63
Book value of shareholders' equity	55	58
Market value of shareholders' equity	210	220

The weights that McClure should apply in estimating Frontier's cost of capital for debt and equity are, respectively:

A $w_d = 0.200$; $w_e = 0.800$.

B $w_d = 0.185$; $w_e = 0.815$.

C $w_d = 0.223$; $w_e = 0.777$.

10 Wang Securities had a long-term stable debt-to-equity ratio of 0.65. Recent bank borrowing for expansion into South America raised the ratio to 0.75. The increased leverage has what effect on the asset beta and equity beta of the company?

A The asset beta and the equity beta will both rise.

B The asset beta will remain the same and the equity beta will rise.

C The asset beta will remain the same and the equity beta will decline.

11 Brandon Wiene is a financial analyst covering the beverage industry. He is evaluating the impact of DEF Beverage's new product line of flavored waters. DEF currently has a debt-to-equity ratio of 0.6. The new product line would be financed with $50 million of debt and $100 million of equity. In estimating the valuation impact of this new product line on DEF's value, Wiene has estimated

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the equity beta and asset beta of comparable companies. In calculating the equity beta for the product line, Wiene is intending to use DEF's existing capital structure when converting the asset beta into a project beta. Which of the following statements is correct?

A Using DEF's debt-to-equity ratio of 0.6 is appropriate in calculating the new product line's equity beta.

B Using DEF's debt-to-equity ratio of 0.6 is not appropriate, but rather the debt-to-equity ratio of the new product, 0.5, is appropriate to use in calculating the new product line's equity beta.

C Wiene should use the new debt-to-equity ratio of DEF that would result from the additional $50 million debt and $100 million equity in calculating the new product line's equity beta.

12 Happy Resorts Company currently has 1.2 million common shares of stock outstanding and the stock has a beta of 2.2. It also has $10 million face value of bonds that have five years remaining to maturity and 8 percent coupon with semi-annual payments, and are priced to yield 13.65 percent. If Happy issues up to $2.5 million of new bonds, the bonds will be priced at par and have a yield of 13.65 percent; if it issues bonds beyond $2.5 million, the expected yield on the entire issuance will be 16 percent. Happy has learned that it can issue new common stock at $10 a share. The current risk-free rate of interest is 3 percent and the expected market return is 10 percent. Happy's marginal tax rate is 30 percent. If Happy raises $7.5 million of new capital while maintaining the same debt-to-equity ratio, its weighted average cost of capital is *closest* to:

A 14.5 percent.

B 15.5 percent.

C 16.5 percent.

The following information relates to Questions 13–18[1]

Jurgen Knudsen has been hired to provide industry expertise to Henrik Sandell, CFA, an analyst for a pension plan managing a global large-cap fund internally. Sandell is concerned about one of the fund's larger holdings, auto parts manufacturer Kruspa AB. Kruspa currently operates in 80 countries, with the previous year's global revenues at €5.6 billion. Recently, Kruspa's CFO announced plans for expansion into Trutan, a country with a developing economy. Sandell worries that this expansion will change the company's risk profile and wonders if he should recommend a sale of the position.

Sandell provides Knudsen with the basic information. Kruspa's global annual free cash flow to the firm is €500 million and earnings are €400 million. Sandell estimates that cash flow will level off at a 2 percent rate of growth. Sandell also estimates that Kruspa's after-tax free cash flow to the firm on the Trutan project for next three years is, respectively, €48 million, €52 million, and €54.4 million. Kruspa recently announced a dividend of €4.00 per share of stock. For the initial analysis, Sandell requests that Knudsen ignore possible currency fluctuations. He expects the Trutanese plant to sell only to customers within Trutan for the first three years. Knudsen is asked to evaluate Kruspa's planned financing of the required €100 million with a €80 million public offering of 10-year debt in Sweden and the remainder with an equity offering.

1 The Level I exam uses only independent questions. This minicase is intended as a learning exercise.

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Additional information:	
Equity risk premium, Sweden	4.82 percent
Risk-free rate of interest, Sweden	4.25 percent
Industry debt-to-equity ratio	0.3
Market value of Kruspa's debt	€900 million
Market value of Kruspa's equity	€2.4 billion
Kruspa's equity beta	1.3
Kruspa's before-tax cost of debt	9.25 percent
Trutan credit A2 country risk premium	1.88 percent
Corporate tax rate	37.5 percent
Interest payments each year	Level

13 Using the capital asset pricing model, Kruspa's cost of equity capital for its typical project is *closest* to:

A 7.62 percent.

B 10.52 percent.

C 12.40 percent.

14 Sandell is interested in the weighted average cost of capital of Kruspa AB prior to its investing in the Trutan project. This weighted average cost of capital (WACC) is *closest* to:

A 7.65 percent.

B 9.23 percent.

C 10.17 percent.

15 In his estimation of the project's cost of capital, Sandell would like to use the asset beta of Kruspa as a base in his calculations. The estimated asset beta of Kruspa prior to the Trutan project is *closest* to:

A 1.053.

B 1.110.

C 1.327.

16 Sandell is performing a sensitivity analysis of the effect of the new project on the company's cost of capital. If the Trutan project has the same asset risk as Kruspa, the estimated project beta for the Trutan project, if it is financed 80 percent with debt, is *closest* to:

A 1.300.

B 2.635.

C 3.686.

17 As part of the sensitivity analysis of the effect of the new project on the company's cost of capital, Sandell is estimating the cost of equity of the Trutan project considering that the Trutan project requires a country equity premium to capture the risk of the project. The cost of equity for the project in this case is *closest* to:

A 10.52 percent.

B 19.91 percent.

C 28.95 percent.

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18 In his report, Sandell would like to discuss the sensitivity of the project's net present value to the estimation of the cost of equity. The Trutan project's net present value calculated using the equity beta without and with the country risk premium are, respectively:

A €26 million and €24 million.

B €28 million and €25 million.

C €30 million and €27 million.

The following information relates to Questions 19–22[2]

Boris Duarte, CFA, covers initial public offerings for Zellweger Analytics, an independent research firm specializing in global small-cap equities. He has been asked to evaluate the upcoming new issue of TagOn, a US-based business intelligence software company. The industry has grown at 26 percent per year for the previous three years. Large companies dominate the market, but sizable "pure-play" companies such as Relevant, Ltd., ABJ, Inc., and Opus Software Pvt. Ltd also compete. Each of these competitors is domiciled in a different country, but they all have shares of stock that trade on the US NASDAQ. The debt ratio of the industry has risen slightly in recent years.

Company	Sales in Millions ($)	Market Value Equity in Millions ($)	Market Value Debt in Millions ($)	Equity Beta	Tax Rate	Share Price ($)
Relevant Ltd.	752	3,800	0.0	1.702	23 percent	42
ABJ, Inc.	843	2,150	6.5	2.800	23 percent	24
Opus Software Pvt. Ltd.	211	972	13.0	3.400	23 percent	13

Duarte uses the information from the preliminary prospectus for TagOn's initial offering. The company intends to issue 1 million new shares. In his conversation with the investment bankers for the deal, he concludes the offering price will be between $7 and $12. The current capital structure of TagOn consists of a $2.4 million five-year non-callable bond issue and 1 million common shares. Other information that Duarte has gathered:

Currently outstanding bonds	$2.4 million five-year bonds, coupon of 12.5 percent, with a market value of $2.156 million
Risk-free rate of interest	5.25 percent
Estimated equity risk premium	7 percent
Tax rate	23 percent

19 The asset betas for Relevant, ABJ, and Opus, respectively, are:

A 1.70, 2.52, and 2.73.

B 1.70, 2.79, and 3.37.

C 1.70, 2.81, and 3.44.

2 The Level I exam uses only independent questions. This minicase is intended as a learning exercise.

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20 The average asset beta for the pure players in this industry, Relevant, ABJ, and Opus, weighted by market value of equity is *closest* to:

A 1.67.

B 1.97.

C 2.27.

21 Using the capital asset pricing model, the cost of equity capital for a company in this industry with a debt-to-equity ratio of 0.01, asset beta of 2.27, and a marginal tax rate of 23 percent is *closest* to:

A 17 percent.

B 21 percent.

C 24 percent.

22 The marginal cost of capital for TagOn, based on an average asset beta of 2.27 for the industry and assuming that new stock can be issued at $8 per share, is *closest* to:

A 20.5 percent.

B 21.0 percent.

C 21.5 percent.

---

23 Two years ago, a company issued $20 million in long-term bonds at par value with a coupon rate of 9 percent. The company has decided to issue an additional $20 million in bonds and expects the new issue to be priced at par value with a coupon rate of 7 percent. The company has no other debt outstanding and has a tax rate of 40 percent. To compute the company's weighted average cost of capital, the appropriate after-tax cost of debt is *closest* to:

A 4.2%.

B 4.8%.

C 5.4%.

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24 An analyst gathered the following information about a company and the market:

Current market price per share of common stock	$28.00
Most recent dividend per share paid on common stock (D_0)	$2.00
Expected dividend payout rate	40%
Expected return on equity (ROE)	15%
Beta for the common stock	1.3
Expected rate of return on the market portfolio	13%
Risk-free rate of return	4%

Using the discounted cash flow (DCF) approach, the cost of retained earnings for the company is *closest* to:

A 15.7%.

B 16.1%.

C 16.8%.

25 An analyst gathered the following information about a company and the market:

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Current market price per share of common stock	$28.00
Most recent dividend per share paid on common stock (D_0)	$2.00
Expected dividend payout rate	40%
Expected return on equity (ROE)	15%
Beta for the common stock	1.3
Expected rate of return on the market portfolio	13%
Risk-free rate of return	4%

Using the Capital Asset Pricing Model (CAPM) approach, the cost of retained earnings for the company is *closest* to:

A 13.6%.

B 15.7%.

C 16.1%.

26 An analyst gathered the following information about a private company and its publicly traded competitor:

Comparable Companies	Tax Rate (%)	Debt/Equity	Equity Beta
Private company	30.0	1.00	N.A.
Public company	35.0	0.90	1.75

Using the pure-play method, the estimated equity beta for the private company is *closest* to:

A 1.029.

B 1.104.

C 1.877.

27 An analyst gathered the following information about the capital markets in the United States and in Paragon, a developing country.

Selected Market Information (%)	
Yield on US 10-year Treasury bond	4.5
Yield on Paragon 10-year government bond	10.5
Annualized standard deviation of Paragon stock index	35.0
Annualized standard deviation of Paragon dollar-denominated government bond	25.0

Based on the analyst's data, the estimated country equity premium for Paragon is *closest* to:

A 4.29%.

B 6.00%.

C 8.40%.

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SOLUTIONS

1 B is correct. The cost of equity is defined as the rate of return required by stockholders.

2 B is correct. Debt is generally less costly than preferred or common stock. The cost of debt is further reduced if interest expense is tax deductible.

3 C is correct. First calculate the growth rate using the sustainable growth calculation, and then calculate the cost of equity using the rearranged dividend discount model:

g = (1 − Dividend payout ratio)(Return on equity) = (1 − 0.30)(15%) = 10.5%

$r_e = (D_1/P_0) + g$ = (\$2.30/\$45) + 10.50% = 15.61%

4 C is correct. FV = \$1,000; PMT = \$40; N = 10; PV = \$900

Solve for *i.* The six-month yield, *i,* is 5.3149%

YTM = 5.3149% × 2 = 10.62985%

$r_d(1 - t)$ = 10.62985%(1 − 0.38) = 6.5905%

5 C is correct. The bond rating approach depends on knowledge of the company's rating and can be compared with yields on bonds in the public market.

6 B is correct. The company can issue preferred stock at 6.5%.

P_p = \$1.75/0.065 = \$26.92

7 B is correct.

Cost of equity = $D_1/P_0 + g$ = \$1.50/\$30 + 7% = 5% + 7% = 12%

$D/(D + E)$ = 0.8033/1.8033 = 0.445

WACC = [(0.445) (0.08)(1 − 0.4)] + [(0.555)(0.12)] = 8.8%

8 B is correct. The weighted average cost of capital, using weights derived from the current capital structure, is the best estimate of the cost of capital for the average-risk project of a company.

9 C is correct.

w_d = \$63/(\$220 + 63) = 0.223

w_e = \$220/(\$220 + 63) = 0.777

10 B is correct. Asset risk does not change with a higher debt-to-equity ratio. Equity risk rises with higher debt.

11 B is correct. The debt-to-equity ratio of the new product should be used when making the adjustment from the asset beta, derived from the comparables, to the equity beta of the new product.

12 B is correct.

Capital structure:

Market value of debt: FV = \$10,000,000, PMT = \$400,000, N = 10,

I/YR = 6.825%. Solving for PV gives the answer \$7,999,688.

Market value of equity: 1.2 million shares outstanding at \$10 = \$12,000,000

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Market value of debt	$7,999,688	40%
Market value of equity	12,000,000	60%
Total capital	$19,999,688	100%

To raise $7.5 million of new capital while maintaining the same capital structure, the company would issue $7.5 million × 40% = $3.0 million in bonds, which results in a before-tax rate of 16 percent.

$r_d(1 - t) = 0.16(1 - 0.3) = 0.112$ or 11.2%

$r_e = 0.03 + 2.2\ (0.10 - 0.03) = 0.184$ or 18.4%

WACC = [0.40(0.112)] + [0.6(0.184)] = 0.0448 + 0.1104 = 0.1552 or 15.52%

13 B is correct.

$r_e = 0.0425 + (1.3)(0.0482) = 0.1052$ or 10.52%

14 B is correct.

WACC = [(€900/€3300) .0925 (1 – 0.375)] + [(€2400/€3300)(0.1052)]
= 0.0923 or 9.23%

15 A is correct.

Asset beta = Unlevered beta = 1.3/(1 + [(1–0.375)(€900/€2400)] = 1.053

16 C is correct.

Project beta = 1.053 {1 + [(1 – 0.375)(€80/€20)]} = 1.053 {3.5} = 3.686

17 C is correct.

$r_e = 0.0425 + 3.686(0.0482 + 0.0188) = 0.2895$ or 28.95%

18 C is correct.

Cost of equity without the country risk premium:

$r_e = 0.0425 + 3.686\ (0.0482) = 0.2202$ or 22.02%

Cost of equity with the country risk premium:

$r_e = 0.0425 + 3.686\ (0.0482 + 0.0188) = 0.2895$ or 28.95%

Weighted average cost of capital without the country risk premium:

WACC = [0.80 (0.0925) (1 – 0.375)] + [0.20 (0.2202)] = 0.04625 + 0.04404
= 0.09038 or 9.03 percent

Weighted average cost of capital with the country risk premium:

WACC = [0.80 (0.0925) (1 – 0.375)] + [0.20 (0.2895)] = 0.04625 + 0.0579
= 0.1042 or 10.42 percent

NPV without the country risk premium:

$$\text{NPV} = \frac{€48 \text{ million}}{(1 + 0.0903)^1} + \frac{€52 \text{ million}}{(1 + 0.0903)^2} + \frac{€54.4 \text{ million}}{(1 + 0.0903)^3} - €100 \text{ million}$$
$$= €44.03 \text{ million} + 43.74 \text{ million} + 41.97 \text{ million} - €100 \text{ million}$$
$$= €29.74 \text{ million}$$

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NPV with the country risk premium:

$$\text{NPV} = \frac{€48 \text{ million}}{(1+0.1042)^1} + \frac{€52 \text{ million}}{(1+0.1042)^2} + \frac{€54.4 \text{ million}}{(1+0.1042)^3} - €100 \text{ million}$$
$$= €43.47 \text{ million} + 42.65 \text{ million} + 40.41 \text{ million} - €100 \text{ million}$$
$$= €26.53 \text{ million}$$

19 B is correct.

Asset betas: $\beta_{equity}/[1 + (1 - t)(D/E)]$

Relevant = 1.702/[1 + (0.77)(0)] = 1.702

ABJ = 2.8/[1 + (0.77)(0.003)] = 2.7918

Opus = 3.4/1 + [(0.77)(0.013)] = 3.3663

20 C is correct.

Weights are determined based on relative market values:

Pure-Play	Market Value of Equity in Millions	Proportion of Total
Relevant	$3,800	0.5490
ABJ	2,150	0.3106
Opus	972	0.1404
Total	$6,922	1.0000

Weighted average beta (0.5490)(1.702) + (0.3106)(2.7918) + (0.1404)(3.3572) = 2.27.

21 B is correct.

Asset beta = 2.27

Levered beta = 2.27 {1 + [(1 − 0.23)(0.01)]} = 2.2875

Cost of equity capital = 0.0525 + (2.2875)(0.07) = 0.2126 or 21.26%

22 C is correct.

For debt: *FV* = 2,400,000; *PV* = 2,156,000; *n* = 10; *PMT* = 150,000

Solve for *i*. *i* = 0.07748. YTM = 15.5%

Before-tax cost of debt = 15.5%

Market value of equity = 1 million shares outstanding + 1 million newly issued shares = 2 million shares at $8 = $16 million

Total market capitalization = $2.156 million + $16 million = $18.156 million

Levered beta = 2.27 {1 + [(1 − 0.23)(2.156/16)]} = 2.27 (1.1038) = 2.5055

Cost of equity = 0.0525 + 2.5055 (0.07) = 0.2279 or 22.79%

Debt weight = $2.156/$18.156 = 0.1187

Equity weight = $16/$18.156 = 0.8813

TagOn's MCC = [(0.1187)(0.155)(1 − 0.23)] + [(0.8813)(0.2279)]
= 0.01417 + 0.20083
= 0.2150 or 21.50%

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23 A is correct. The relevant cost is the marginal cost of debt. The before-tax marginal cost of debt can be estimated by the yield to maturity on a comparable outstanding. After adjusting for tax, the after-tax cost is 7(1 – 0.4) = 7(0.6) = 4.2%.

24 C is correct. The expected return is the sum of the expected dividend yield plus expected growth. The expected growth is (1 – 0.4)15% = 9%. The expected dividend yield is $2.18/$28 = 7.8%. The sum is 16.8%.

25 B is correct. Using the CAPM approach, 4% + 1.3(9%) = 15.7%.

26 C is correct. Inferring the asset beta for the public company: unlevered beta = 1.75/[1 + (1 – 0.35) (0.90)] = 1.104. Relevering to reflect the target debt ratio of the private firm: levered beta = 1.104 × [1 + (1 – 0.30) (1.00)] = 1.877.

27 C is correct. The country equity premium can be estimated as the sovereign yield spread times the volatility of the country's stock market relative to its bond market. Paragon's equity premium is (10.5% – 4.5%) × (35%/25%) = 6% × 1.4 = 8.40%.

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PRACTICE PROBLEMS

1 If two companies have identical unit sales volume and operating risk, they are *most likely* to also have identical:

A sales risk.

B business risk.

C sensitivity of operating earnings to changes in the number of units produced and sold.

2 Degree of operating leverage is *best* described as a measure of the sensitivity of:

A net earnings to changes in sales.

B fixed operating costs to changes in variable costs.

C operating earnings to changes in the number of units produced and sold.

3 The Fulcrum Company produces decorative swivel platforms for home televisions. If Fulcrum produces 40 million units, it estimates that it can sell them for $100 each. Variable production costs are $65 per unit and fixed production costs are $1.05 billion. Which of the following statements is *most accurate*? Holding all else constant, the Fulcrum Company would:

A generate positive operating income if unit sales were 25 million.

B have less operating leverage if fixed production costs were 10 percent greater than $1.05 billion.

C generate 20 percent more operating income if unit sales were 5 percent greater than 40 million.

4 The business risk of a particular company is *most accurately* measured by the company's:

A debt-to-equity ratio.

B efficiency in using assets to generate sales.

C operating leverage and level of uncertainty about demand, output prices, and competition.

5 Consider two companies that operate in the same line of business and have the same degree of operating leverage: the Basic Company and the Grundlegend Company. The Basic Company and the Grundlegend Company have, respectively, no debt and 50 percent debt in their capital structure. Which of the following statements is *most accurate*? Compared to the Basic Company, the Grundlegend Company has:

A a lower sensitivity of net income to changes in unit sales.

B the same sensitivity of operating income to changes in unit sales.

C the same sensitivity of net income to changes in operating income.

6 Myundia Motors now sells 1 million units at ¥3,529 per unit. Fixed operating costs are ¥1,290 million and variable operating costs are ¥1,500 per unit. If the company pays ¥410 million in interest, the levels of sales at the operating breakeven and breakeven points are, respectively:

A ¥1,500,000,000 and ¥2,257,612,900.

B ¥2,243,671,760 and ¥2,956,776,737.

C ¥2,975,148,800 and ¥3,529,000,000.

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7 Juan Alavanca is evaluating the risk of two companies in the machinery industry: The Gearing Company and Hebelkraft, Inc. Alavanca used the latest fiscal year's financial statements and interviews with managers of the respective companies to gather the following information:

	The Gearing Company	Hebelkraft, Inc.
Number of units produced and sold	1 million	1.5 million
Sales price per unit	$200	$200
Variable cost per unit	$120	$100
Fixed operating cost	$40 million	$90 million
Fixed financing expense	$20 million	$20 million

Based on this information, the breakeven points for The Gearing Company and Hebelkraft, Inc. are:

A 0.75 million and 1.1 million units, respectively.

B 1 million and 1.5 million units, respectively.

C 1.5 million and 0.75 million units, respectively.

The following information relates to Questions 8–16

Mary Benn, CFA, is a financial analyst for Twin Fields Investments, located in Storrs, Connecticut, USA. She has been asked by her supervisor, Bill Cho, to examine two small Japanese cell phone component manufacturers: 4G, Inc. and Qphone Corp. Cho indicates that his clients are most interested in the use of leverage by 4G and Qphone. Benn states, "I will have to specifically analyze each company's respective business risk, sales risk, operating risk, and financial risk." "Fine, I'll check back with you shortly," Cho, answers.

Benn begins her analysis by examining the sales prospects of the two firms. The results of her sales analysis appear in Exhibit 1. She also expects very little price variability for these cell phones. She next gathers more data on these two companies to assist her analysis of their operating and financial risk.

When Cho inquires as to her progress Benn responds, "I have calculated Qphone's degree of operating leverage (DOL) and degree of financial leverage (DFL) at Qphone's 2009 level of unit sales. I have also calculated Qphone's breakeven level for unit sales. I will have 4G's leverage results shortly."

Cho responds, "Good, I will call a meeting of some potential investors for tomorrow. Please help me explain these concepts to them, and the differences in use of leverage by these two companies. In preparation for the meeting, I have a number of questions":

- "You mentioned business risk; what is included in that?"
- "How would you classify the risk due to the varying mix of variable and fixed costs?"
- "Could you conduct an analysis and tell me how the two companies will fare relative to each other in terms of net income if their unit sales increased by 10 percent above their 2009 unit sales levels?"
- "Finally, what would be an accurate verbal description of the degree of total leverage?"

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The relevant data for analysis of 4G is contained in Exhibit 2, and Benn's analysis of the Qphone data appears in Exhibit 3:

Exhibit 1 Benn's Unit Sales Estimates for 4G, Inc. and Qphone Corp.

Company	2009 Unit Sales	Standard Deviation of Unit Sales	2010 Expected Unit Sales Growth Rate (%)
4G, Inc.	1,000,000	25,000	15
Qphone Corp.	1,500,000	10,000	15

Exhibit 2 Sales, Cost, and Expense Data for 4G, Inc. (At Unit Sales of 1,000,000)

Number of units produced and sold	1,000,000
Sales price per unit	¥108
Variable cost per unit	¥72
Fixed operating cost	¥22,500,000
Fixed financing expense	¥9,000,000

Exhibit 3 Benn's Analysis of Qphone (At Unit Sales of 1,500,000)

Degree of operating leverage	1.40
Degree of financial leverage	1.15
Breakeven quantity (units)	571,429

8 Based on Benn's analysis, 4G's sales risk relative to Qphone's is *most likely* to be:

A lower.

B equal.

C higher.

9 What is the *most appropriate* response to Cho's question regarding the components of business risk?

A Sales risk and financial risk.

B Operating risk and sales risk.

C Financial risk and operating risk.

10 The *most appropriate* response to Cho's question regarding the classification of risk arising from the mixture of variable and fixed costs is:

A sales risk.

B financial risk.

C operating risk.

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11 Based on the information in Exhibit 2, the degree of operating leverage (DOL) of 4G, Inc., at unit sales of 1,000,000, is *closest* to:

A 1.60.

B 2.67.

C 3.20.

12 Based on the information in Exhibit 2, 4G, Inc.'s degree of financial leverage (DFL), at unit sales of 1,000,000, is *closest* to:

A 1.33.

B 2.67.

C 3.00.

13 Based on the information in Exhibit 1 and Exhibit 3, Qphone's expected percentage change in operating income for 2010 is *closest* to:

A 17.25%.

B 21.00%.

C 24.30%.

14 4G's breakeven quantity of unit sales is *closest* to:

A 437,500 units.

B 625,000 units.

C 875,000 units.

15 In response to Cho's question regarding an increase in unit sales above 2009 unit sales levels, it is *most likely* that 4G's net income will increase at:

A a slower rate than Qphone's.

B the same rate as Qphone's.

C a faster rate than Qphone's.

16 The *most appropriate* response to Cho's question regarding a description of the degree of total leverage is that degree of total leverage is:

A the percentage change in net income divided by the percentage change in units sold.

B the percentage change in operating income divided by the percentage change in units sold.

C the percentage change in net income divided by the percentage change in operating income.

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SOLUTIONS

1 C is correct. The companies' degree of operating leverage should be the same, consistent with C. Sales risk refers to the uncertainty of the number of units produced and sold and the price at which units are sold. Business risk is the joint effect of sales risk and operating risk.

2 C is correct. The degree of operating leverage is the elasticity of operating earnings with respect to the number of units produced and sold. As an elasticity, the degree of operating leverage measures the sensitivity of operating earnings to a change in the number of units produced and sold.

3 C is correct. Because DOL is 4, if unit sales increase by 5 percent, Fulcrum's operating earnings are expected to increase by 4 × 5% = 20%. The calculation for DOL is:

$$\text{DOL} = \frac{(40 \text{ million})(\$100 - \$65)}{\left[(40 \text{ million})(\$100 - \$65)\right] - \$1.05 \text{ billion}}$$
$$= \frac{\$1.400 \text{ billion}}{\$1.400 \text{ billion} - \$1.05 \text{ billion}} = \frac{\$1.4}{\$0.35} = 4$$

4 C is correct. Business risk reflects operating leverage and factors that affect sales (such as those given).

5 B is correct. Grundlegend's degree of operating leverage is the same as Basic Company's, whereas Grundlegend's degree of total leverage and degree of financial leverage are higher.

6 B is correct.

$$\text{Operating breakeven units} = \frac{¥1{,}290 \text{ million}}{(¥3{,}529 - ¥1{,}500)} = 635{,}781.173 \text{ units}$$
$$\text{Operating breakeven sales} = ¥3{,}529 \times 635{,}781.173 \text{ units} = ¥2{,}243{,}671{,}760$$

or

$$\text{Operating breakeven sales} = \frac{¥1{,}290 \text{ million}}{1 - (¥1{,}500/¥3{,}529)} = ¥2{,}243{,}671{,}760$$

$$\text{Total breakeven} = \frac{¥1{,}290 \text{ million} + ¥410 \text{ million}}{(¥3{,}529 - ¥1{,}500)} = \frac{¥1{,}700 \text{ million}}{¥2{,}029}$$
$$= 837{,}851.1582 \text{ units}$$
$$\text{Breakeven sales} = ¥3{,}529 \times 837{,}851.1582 \text{ units} = ¥2{,}956{,}776{,}737$$

or

$$\text{Breakeven sales} = \frac{¥1{,}700 \text{ million}}{1 - (¥1{,}500/¥3{,}529)} = ¥2{,}956{,}776{,}737$$

7 A is correct. For The Gearing Company,

$$Q_{\text{BE}} = \frac{F + C}{P - V} = \frac{\$40 \text{ million} + \$20 \text{ million}}{\$200 - \$120} = 750{,}000$$

For Hebelkraft, Inc.,

$$Q_{\text{BE}} = \frac{F + C}{P - V} = \frac{\$90 \text{ million} + \$20 \text{ million}}{\$200 - \$100} = 1{,}100{,}000$$

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8 C is correct. Sales risk is defined as uncertainty with respect to the price or quantity of goods and services sold. 4G has a higher standard deviation of unit sales than Qphone; in addition, 4G's standard deviation of unit sales stated as a fraction of its level of unit sales, at 25,000/1,000,000 = 0.025, is greater than the comparable ratio for Qphone, 10,000/1,500,000 = 0.0067.

9 B is correct. Business risk is associated with operating earnings. Operating earnings are affected by sales risk (uncertainty with respect to price and quantity), and operating risk (the operating cost structure and the level of fixed costs).

10 C is correct. Operating risk refers to the risk arising from the mix of fixed and variable costs.

11 B is correct. $\text{DOL} = \dfrac{Q(P-V)}{Q(P-V)-F}$

$$\text{DOL @ 1,000,000 units} = \frac{1{,}000{,}000(¥108 - ¥72)}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000} = 2.67$$

12 C is correct. Degree of financial leverage is

$$\text{DFL} = \frac{\left[Q(P-V)-F\right]}{\left[Q(P-V)-F-C\right]}$$

$$= \frac{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000 - ¥9{,}000{,}000} = 3.00$$

13 B is correct. The degree of operating leverage of Qphone is 1.4. The percentage change in operating income is equal to the DOL times the percentage change in units sold, therefore:

$$\text{Percentage change in operating income} = (\text{DOL})\left(\text{Percentage change in units sold}\right) = (1.4)(15\%) = 21\%$$

14 C is correct. The breakeven quantity is computed

$$Q_{\text{BE}} = \frac{F+C}{P-V} = \frac{(¥22{,}500{,}000 + ¥9{,}000{,}000)}{(¥108 - ¥72)} = 875{,}000$$

15 C is correct. 4G, Inc.'s degree of total leverage can be shown to equal 8, whereas Qphone Corp.'s degree of total leverage is only DOL × DFL = 1.4 × 1.15 = 1.61. Therefore, a 10 percent increase in unit sales will mean an 80 percent increase in net income for 4G, but only a 16.1 percent increase in net income for Qphone Corp. The calculation for 4G, Inc.'s DTL is

$$\text{DTL} = \frac{Q(P-V)}{Q(P-V)-F-C}$$

$$= \frac{1{,}000{,}000(¥108 - ¥72)}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000 - ¥9{,}000{,}000} = 8.00$$

16 A is correct. Degree of total leverage is defined as the percentage change in net income divided by the percentage change in units sold.

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PRACTICE PROBLEMS

1 Suppose a company has a current ratio of 2.5 times and a quick ratio of 1.5 times. If the company's current liabilities are €100 million, the amount of inventory is *closest* to:

A €50 million.

B €100 million.

C €150 million.

2 Given the following financial statement data, calculate the operating cycle for this company.

	In Millions ($)
Credit sales	25,000
Cost of goods sold	20,000
Accounts receivable	2,500
Inventory—Beginning balance	2,000
Inventory—Ending balance	2,300
Accounts payable	1,700

The operating cycle for this company is *closest* to:

A 42.0 days.

B 47.9 days.

C 75.7 days.

3 Given the following financial statement data, calculate the net operating cycle for this company.

	In Millions ($)
Credit sales	40,000
Cost of goods sold	30,000
Accounts receivable	3,000
Inventory—Beginning balance	1,500
Inventory—Ending balance	2,000
Accounts payable	4,000

The net operating cycle of this company is *closest* to:

A 0.80 days.

B 24.3 days.

C 51.7 days.

4 The bond equivalent yield for a 182-day US Treasury bill that has a price of $9,725 per $10,000 face value is *closest* to:

A 5.44%.

B 5.53%.

C 5.67%.

5 A company increasing its credit terms for customers from 1/10, net 30 to 1/10, net 60 will *most likely* experience:

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A an increase in cash on hand.

B a higher level of uncollectible accounts.

C an increase in the average collection period.

6 Suppose a company uses trade credit with the terms of 2/10, net 50. If the company pays its account on the 50th day, the effective borrowing cost of skipping the discount on day 10 is *closest* to:

A 14.9%.

B 15.0%.

C 20.2%.

7 William Jones is evaluating three possible means of borrowing $1 million for one month:

- Drawing down on a line of credit at 7.2 percent with a 1/2 percent commitment fee on the full amount with no compensating balances.
- A banker's acceptance at 7.1 percent, an all-inclusive rate.
- Commercial paper at 6.9 percent with a dealer's commission of 1/4 percent and a backup line cost of 1/3 percent, both of which would be assessed on the $1 million of commercial paper issued.

Which of these forms of borrowing results in the lowest cost of credit?

A Line of credit.

B Banker's acceptance.

C Commercial paper.

The following information relates to Questions 8–12

Mary Gonzales is evaluating companies in the office supply industry and has compiled the following information:

	20X1		20X2	
Company	Credit Sales ($)	Average Receivables Balance ($)	Credit Sales ($)	Average Receivables Balance ($)
A	5.0 million	1.0 million	6.0 million	1.2 million
B	3.0 million	1.2 million	4.0 million	1.5 million
C	2.5 million	0.8 million	3.0 million	1.0 million
D	0.5 million	0.1 million	0.6 million	0.2 million
Industry	25.0 million	5.0 million	28.0 million	5.4 million

8 Which of the companies had the highest number of days of receivables for the year 20X1?

A Company A.

B Company B.

C Company C.

9 Which of the companies has the lowest accounts receivable turnover in the year 20X2?

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A Company A.

B Company B.

C Company D.

10 The industry average receivables collection period:

A increased from 20X1 to 20X2.

B decreased from 20X1 to 20X2.

C did not change from 20X1 to 20X2.

11 Which of the companies reduced the average time it took to collect on accounts receivable from 20X1 to 20X2?

A Company B.

B Company C.

C Company D.

12 Mary determined that Company A had an operating cycle of 100 days in 20X2, whereas Company D had an operating cycle of 145 days for the same fiscal year. This means that:

A Company D's inventory turnover is less than that of Company A.

B Company D's inventory turnover is greater than that of Company A.

C Company D's cash conversion cycle is shorter than that of Company A.

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SOLUTIONS

1 B is correct.

Current ratio = Current assets/Current Liabilities = Current assets/ €100 million = 2.5

Therefore, current assets = €250 million

Quick ratio = (Current assets – Inventory)/ Current Liabilities = (€250 million – Inventory)/€100 million = 1.5

Therefore, Inventory = **€100 million**

2 C is correct.

Number of days of inventory = [($2,300 + $2,000)/2]/($20,000/365) = 39.238 days

Number of days of receivables = $2,500/($25,000/365) = 36.5 days

Operating cycle = 39.238 + 36.5 days = **75.738 days**

Note: The net operating cycle is 45.2 days.

Purchases = $20,000 + $2,300 – $2,000 = $20,300

Number of days of payables = $1,700/($20,300/365) = 30.567 days

The net operating cycle is 75.738 – 30.567 = 45.171 days

3 A is correct.

Number of days of inventory = [($2,000 + $1,500)/2]/($30,000/365) = 21.292 days

Number of days of receivables = $3,000/($40,000/365) = 27.375 days

Operating cycle = 21.292 + 27.375 days = 48.667 days

Purchases = $30,000 + $2,000 – $1,500 = $30,500

Number of days of payables = $4,000/($30,500/365) = 47.869 days

The net operating cycle is 48.667 – 47.869 = **0.798 days**

4 C is correct.

Bond equivalent yield = [($10,000 – 9,725)/$9,725] × (365/182) = **5.671 percent**

5 C is correct. A higher level of uncollectible accounts may occur, but a longer average collection period will certainly occur.

6 C is correct.

$$\text{Cost} = \left(1 + \frac{0.02}{0.98}\right)^{365/40} - 1 = 20.24 \text{ percent}$$

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7 B is correct.

$$\text{Line cost} = \frac{\text{Interest} + \text{Commitment fee}}{\text{Net Proceed}} \times 12$$
$$= \frac{(0.072 \times \$1{,}000{,}000 \times 1/12) + (0.005 \times \$1{,}000{,}000 \times 1/12)}{\$1{,}000{,}000} \times 12$$
$$= \frac{\$6{,}000 + 416.67}{\$1{,}000{,}000} \times 12 = 0.077 \text{ or } 7.7 \text{ percent}$$

$$\text{Banker's acceptance cost} = \frac{\text{Interest}}{\text{Net Proceed}} \times 12$$
$$= \frac{(0.071 \times \$1{,}000{,}000 \times 1/12)}{\$1{,}000{,}000 - (0.071 \times \$1{,}000{,}000 \times 1/12)} \times 12$$
$$= \frac{\$5{,}916.67}{\$994{,}083.33} \times 12 = 0.0714 \text{ or } 7.14 \text{ percent}$$

$$\text{Commercial paper cost} = \frac{\text{Interest} + \text{Dealer's commission} + \text{Backup costs}}{\text{Net proceed}} \times 12$$
$$= \frac{(0.069 \times \$1{,}000{,}000 \times 1/12) + (0.0025 \times \$1{,}000{,}000 \times 1/12) + (0.003333 \times \$1{,}000{,}000 \times 1/12)}{\$1{,}000{,}000 - (0.069 \times \$1{,}000{,}000 \times 1/12)} \times 12$$
$$= \frac{\$5{,}750 + 208.33 + 277.78}{\$1{,}000{,}000 - 5{,}750} \times 12 = 0.0753 \text{ or } 7.53 \text{ percent}$$

8 B is correct.

Company A: $1.0 million/($5.0 million/365) = 73.0 days

Company B: $1.2 million/($3.0 million/365) = 146.0 days

Company C: $0.8 million/($2.5 million/365) = 116.8 days

Company D: $0.1 million/($0.5 million/365) = 73.0 days

9 B is correct.

Company A: $6.0 million/$1.2 million = 5.00

Company B: $4.0 million/$1.5 million = 2.67

Company C: $3.0 million/$1.0 million = 3.00

Company D: $0.6 million/$0.2 million = 3.00

10 B is correct.

20X1: 73 days

20X2: 70.393

Note: If the number of days decreased from 20X1 to 20X2, the receivable turnover increased.

11 A is correct.

Company B increased its accounts receivable (A/R) turnover and reduced its number of days of receivables between 20X1 and 20X2.

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Company	20X1		20X2	
	A/R Turnover	Number of Days of Receivables	A/R Turnover	Number of Days of Receivables
A	5.000	73.000	5.000	73.000
B	2.500	146.000	2.667	136.875
C	3.125	116.800	3.000	121.667
D	5.000	73.000	3.000	121.667

12 B is correct.

Company A number of days of inventory = 100 – 73 = 27 days

Company D number of days of inventory = 145 – 121.67 = 23.33 days

Company A's turnover = 365/27 = 13.5 times

Company D's inventory turnover = 365/23.3 = 15.6 times

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Equity Investments

STUDY SESSIONS

Study Session 12	Equity Investments (1)
Study Session 13	Equity Investments (2)

TOPIC LEVEL LEARNING OUTCOME

The candidate should be able to describe characteristics of equity investments, security markets, and indexes. The candidate should also be able to analyze industries, companies, and equity securities and to describe and demonstrate the use of basic equity valuation models.

Global equities are an important asset class for meeting longer term growth and diversification objectives. Global equities also represent a substantial share of capital markets that has been expanding in breadth and depth as developing economies come to market for equity capital. As developed and emerging economies continue to open their markets to investment, their activity is expected to significantly change the composition of world equity markets.

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