cLO.a: Define and explain leverage, business risk, sales risk, operating risk, and financial risk, and classify a risk.

1. The risk associated with the market demand for a product and the price received for it is *best* described as:
   A. Business risk.
   B. Operating risk.
   C. Sales risk.

2. Business risk of a company reflects both its:
   A. Sales risk and financial risk.
   B. Financial risk and operating risk.
   C. Operating risk and sales risk.

3. Financial risk is *least likely* affected by:
   A. Debt.
   B. Dividends.
   C. Long-term leases.

LO.b: Calculate and interpret the degree of operating leverage, the degree of financial leverage, and the degree of total leverage.

4. The unit contribution margin for a product is $12. A firm's fixed operating cost is $600,000. The degree of operating leverage (DOL) is *most likely* the lowest at which of the following production levels (in units)?
   A. 100,000.
   B. 200,000.
   C. 300,000.

5. While analyzing the impact of the economy's growth on the revenues generated by Com Point, Mr. Shah recorded earnings of Rs.200 billion and expected them to grow by 10% due to the increasing demand. To evaluate the impact of this, he wants to calculate the operating leverage with the following data:

Sales in 2009	22.5 million computers
Average price per computer	Rs.90,000
Fixed costs for the period	Rs.33 billion
Variable costs per computer	Rs.70,000

What is the degree of operating leverage (DOL)?
   A. 1.03.
   B. 1.08.
   C. 1.33.

6. 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 sold.

7. Soma Autos employs debt financing, borrowing at a rate of 10%. The interest cost at this rate equals Rs.65 billion. For 8 million cars, what is the degree of financial leverage (DFL) for Soma given revenue per car is Rs.25,000, variable cost per car is Rs.14,000 and fixed costs equal Rs.15 billion?
   A. 8.67.
   B. 9.13.
   C. 10.76.

8. For firms with a high proportion of fixed costs relative to total costs, a small change in sales will cause a:
   A. Large change in earnings.
   B. Decrease in debt to equity ratio.
   C. Small change in earnings.

9. The following data is available for two companies.

	Siptea	**Brewers**
Number of units sold	200,000	200,000
Sales price per unit	$150	$150
Variable cost per unit	$43	$98
Fixed operating cost	500,000	150,000
Fixed financing cost	100,000	50,000

The DOL for Siptea and Brewers are *closest* to:

   A. 1.54 and 1.32 respectively.
   B. 1.024 and 1.015 respectively.
   C. 1.067 and 1.021 respectively.

10. Asparagus Inc. and Supras Inc. have the same revenue and operating income but Asparagus is more highly leveraged relative to Supras. Which of the following statements is *least likely* correct?
   A. Asparagus will have a lower net income relative to Supras.
   B. Asparagus will have a higher ROE relative to Supras.
   C. Both companies will have the same operating leverage.

11. The following data is available for Ejaz Business:

	Ejaz Business
Number of units sold	1 million
Sales price per unit	Rs. 100
Variable cost per unit	Rs. 20
Fixed operating cost	5 million
Fixed financing cost	1 million

The degree of total leverage for the company is *closest* to:

   A. 1.02.

B. 1.08.
C. 1.12.

12. Which of the following is not affected by changes in tax rate?
    A. Net Profit Margin.
    B. WACC.
    C. DFL.

13. Which of the following is the *most appropriate* reason for analysts to understand a company's use of operating and financial leverage?
    A. To analyze the past performance of the company.
    B. To evaluate the operating margin of the company.
    C. To forecast future cash flows and select an appropriate discount rate.

14. Using the firm's income statement presented below, its degree of financial leverage is *closest* to:

Income Statement	**$ millions**
Revenues	15.2
Variable Operating Costs	9.8
Fixed Operating Costs	3.5
Operating Income	1.9
Interest	1.0
Taxable Income	0.9
Tax	0.2
Net Income	0.7

    A. 1.6.
    B. 2.1.
    C. 2.7.

15. Using the company's income statement presented, its degree of operating leverage is *closest* to:

Income Statement	**$ millions**
Revenues	10.5
Variable Operating Costs	6.8
Fixed Operating Costs	2.5
Operating Income	1.2
Interest	0.4
Taxable Income	0.8
Tax	0.2
Net Income	0.6

    A. 3.1.
    B. 3.4.
    C. 6.2.

16. A manufacturing company has the following income statement.

Income Statement	**$ millions**

Revenues	1100
Variable costs	450
Fixed costs	225
EBIT	425
Interest	70
Taxable Income	355
Tax	142
Net Income	213

The degree of total leverage for the company is *closest* to:

A. 1.20.
B. 1.53.
C. 1.83.

17. Fred has the following information available.

Operating income	$500,000
Net income	$275,000

Given that the degree of total leverage is 3.63, the degree of operating leverage is *closest* to:

A. 1.30.
B. 1.81.
C. 2.00.

LO.c: Analyze the effect of financial leverage on a company's net income and return on equity.

18. Alpha and Beta both operate in the automobile sector with the same degree of operating leverage. Alpha has a capital structure of 40% debt and 60% equity, while Beta is financed completely by equity. Which of the following statements is *most* accurate? Compared to Beta, Alpha has:

A. The same sensitivity of operating income to changes in unit sales.
B. The same sensitivity of net income to changes in operating income.
C. A lower sensitivity of net income to changes in unit sales.

19. All else equal, company A has greater financial leverage compared to its counterpart company B. Which of the following statements is *least* accurate?

A. Company A has a greater risk of default.
B. Company A has higher net income.
C. Company A has higher return on equity.

LO.d: Calculate the breakeven quantity of sales and determine the company's net income at various sales levels.

20. A company manufactures items with a selling price of $125 at a variable cost of $62.5 per unit. The operating fixed costs incurred by the company are $250,000, while the fixed interest charges incurred are $65,000. The company is liable to pay taxes at a rate of 35%.

The quantity of items that the company should manufacture and sell to break-even is *closest* to:

A. 5,040.
B. 4,676.
C. 4,000.

21. Soomros now sells 1 million units at Rs.3,972 per unit. Fixed operating costs are Rs.1,960 million and variable operating costs are Rs.1,250 per unit. If the company pays Rs.376 million in interest, the levels of sales at the operating breakeven and the level of sales at the breakeven points are, respectively:

A. Rs.2,860,073,475 and Rs.3,408,740,632.
B. Rs.2,875,073,470 and Rs.3,428,740,630.
C. Rs.3,560,073,475 and Rs.4,105,740,632.

22. In order to assess the riskiness of two companies in the same industry, Mr. Habitt collected the following information from the latest financial statements and management discussions for Habitt and Machinesque respectively:

- Number of units produced and sold: 2.7 million and 3.5 million
- Sales price per unit: Rs.2000 each
- Variable cost per unit: Rs.1200 and Rs.1000
- Fixed operating cost: Rs.40 million and Rs.75 million
- Fixed financing expense: Rs.30 million each

Based on this information, the breakeven points for Habitt and Machinesque are *closest* to:

A. 0.0875 million and 0.105 million respectively.
B. 0.536 million and 1.1 million respectively.
C. 1.1 million and 0.075 million respectively.

23. The owner of a TV store is forecasting for the year 2014 and wants to find out the breakeven point of 2013 with the following data to ensure accuracy:

Revenue	Rs. 0.12 million per TV set
Variable cost	Rs. 0.053 million per TV set
Fixed cost (including interest cost)	Rs. 200 billion

The breakeven quantity is *closest to*:

A. 2.0 million TV sets.
B. 2.5 million TV sets.
C. 3.0 million TV sets.

LO.e: Calculate and interpret the operating breakeven quantity of sales.

24. The unit contribution margin for a product is $15. Assuming fixed costs of $15,000, interest costs of $4,000, and a tax rate of 40%, the operating breakeven point (in units) is *closest to:*

A. 870.
B. 1,000.
C. 1,200.

25. The per unit contribution margin for a product is $24. Assuming fixed costs of $48,000, interest costs of $5,000, and taxes of $3,000, the operating breakeven point (in units) is *closest* to:
    A. 1,667.
    B. 2,000.
    C. 2,333.

26. The unit contribution margin for a product is $20. Assuming fixed costs of $200,000, interest costs of $25,000, and a tax rate of 35%, the operating breakeven point (in units) is *closest* to:
    A. 11,250.
    B. 10,813.
    C. 10,000.

Solutions

1. C is correct. Sales risk is associated with uncertainty with respect to total revenue, which in turn, depends on price and units sold.

2. C is correct. Business risk is the risk associated with operating earnings and reflects both sales risk (uncertainty with respect to the price and quantity of sales) and operating risk (the risk related to the use of fixed costs in operations).

3. B is correct. By taking on fixed obligations, such as debt and long-term leases, the company increases its financial risk.

4. C is correct. DOL = $\frac{\text{quantity} * \text{contribution margin}}{[(\text{quantity} * \text{contribution margin}) - \text{fixed costs}]}$
   DOL (100,000 units) = $\frac{\$12 * 100{,}000}{(\$12 * 100{,}000) - 600{,}000} = 2.00$
   DOL (200,000 units) = $\frac{\$12 * 200{,}000}{(\$12 * 200{,}000) - 600{,}000} = 1.33$
   DOL (300,000 units) = $\frac{\$12 * 300{,}000}{(\$12 * 300{,}000) - 600{,}000} = 1.20$
   The DOL is lowest at the 300,000 unit production level.

5. B is correct.
   $\text{DOL} = \frac{[Q * (P - V)]}{[Q(P - V) - F]} = \frac{22.5 \text{ million } (\text{Rs. } 90{,}000 - \text{Rs. } 70{,}000)}{22.5 \text{ million } (\text{Rs. } 90{,}000 - \text{Rs. } 70{,}000) - 33 \text{ billion}} = 1.08$
   For a 10 percent increase in computers sold, operating income increases by 1.08 * 10% = 10.08%.

6. 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 elasticity, the degree of operating leverage measures the sensitivity of operating earnings to a change in the number of units produced and sold.

7. B is correct.
   Operating income for 8 million cars = 8 million (25,000 – 14,000) – 15 billion = 73 billion.
   $\text{DFL} = \frac{[Q(P - V) - F]}{[Q(P - V) - F - C]} = \frac{\text{Rs. } 73 \text{ billion}}{\text{Rs. } 73 \text{ billion} - \text{Rs. } 65 \text{ billion}} = 9.13$

8. A is correct. For highly leveraged firms, that is firms with a high proportion of fixed costs relative to total costs, a small change in sales will have a big impact on earnings.

9. B is correct.
   DOL for Siptea: $\frac{200{,}000 \ (\$150 - \$43)}{200{,}000 \ (\$150 - \$43) - 500{,}000} = 1.024$
   DOL for Brewers: $\frac{200{,}000 \ (\$150 - \$98)}{200{,}000 \ (\$150 - \$98) - 150{,}000} = 1.015$

10. B is correct. A is a true statement because higher leverage implies a greater interest expense and hence a lower net income. C is true because both companies have the same revenue and operating income. B is least likely true because Asparagus will have a lower ROE relative to Supras.

11. B is correct.
$$\text{DTL} = \frac{[\text{Q}(\text{P}-\text{V})]}{[\text{Q}(\text{P}-\text{V})-\text{F}-\text{C}]} = \frac{1 \text{ million (Rs. } 100 - \text{ Rs. } 20)}{1 \text{ million (Rs. } 100 - \text{ Rs. } 20) - 5 \text{ million} - 1 \text{ million}} = 1.08$$

12. C is correct. DFL is not affected by the tax rate whereas WACC and net profit margin are both impacted by changes in tax rate.

13. C is correct. Analysts need to understand a company's use of operating and financial leverage to forecast future cash flows and select an appropriate discount rate.

14. B is correct. $\text{DFL} = \frac{\text{Operating income}}{\text{Operating income} - \text{Interest expense}} = \frac{\text{Q}(\text{P}-\text{V})-F}{[\text{Q}(\text{P}-\text{V})-\text{F}-\text{C}]} = \frac{\$1.9}{\$0.9} = 2.11.$

15. A is correct. $\text{DOL} = \frac{\text{Revenues} - \text{Variable operating costs}}{\text{Revenues} - \text{Variable operating costs} - \text{Fixed operating costs}} = \frac{\text{Q}(\text{P}-\text{V})}{[\text{Q}(\text{P}-\text{V})-\text{F}]} = \frac{10.5 - 6.8}{10.5 - 6.8 - 2.5} = 3.1$

16. C is correct.
$$\text{DTL} = \frac{[\text{Q}\,(\text{P} - \text{V})]}{[\text{Q}\,(\text{P} - \text{V}) - \text{F} - \text{C}]} = \frac{1100 - 450}{355} = 1.83$$

17. C is correct. First, compute the degree of financial leverage: 500,000/275,000 = 1.818. Next, compute the degree of operating leverage: $\text{DTL} = \text{Degree of financial leverage} * \text{Degree of operational leverage}$. $3.63 = 1.818 * \text{Degree of operational leverage}$. $\text{DOL} = 2$

18. A is correct. Alpha's degree of operating leverage is the same as Beta's, whereas Alpha's degree of total leverage and degree of financial leverage are higher.

19. B is correct. Financial leverage reduces net income by the interest cost, but increases return on equity because net income is generated with less equity.

20. A is correct. $\text{Breakeven quantity} = \frac{\text{Fixed operating costs + fixed financial costs}}{\text{Price per unit} - \text{variable cost per unit}} = \frac{\text{F+C}}{\text{P}-\text{V}} =$
$= \frac{250{,}000 + 65000}{125 - 62.5} = 5{,}040$

21. A is correct.
$$\text{Operating breakeven units} = \frac{\text{F}}{\text{P} - \text{V}} = \frac{\text{Rs. } 1{,}960 \text{ million}}{(\text{Rs. } 3{,}972 - \text{Rs. } 1{,}250)} = 720{,}058.7803 \text{ units}$$
$$\text{Operating breakeven sales} = \text{Rs. } 3{,}972 * 720{,}058.7803 \text{ units} = \text{Rs. } 2{,}860{,}073{,}475$$

or

$$\text{Operating breakeven sales} = \frac{\text{Rs. 1,960 million}}{1 - (\text{Rs. 1,250/ Rs. 3,972})} = \text{Rs. 2,860,073,475}$$

$$\text{Total breakeven} = \frac{\text{Rs. 1,960 million} + \text{Rs. 376 million}}{(\text{Rs. 3,972} - \text{Rs. 1,250})} = \frac{\text{Rs. 2,336 million}}{2{,}722} = 858{,}192.5055$$

$$\text{Breakeven sales} = \text{Rs. 3,972} * 858{,}192.5055 \text{ units} = \text{Rs. 3,408,740,632}$$

or

$$\text{Breakeven sales} = \frac{\text{Rs. 2,336 million}}{1 - (\text{Rs. 1,250/ Rs. 3,972})} = \text{Rs. 3,408,740,632}$$

22. A is correct.

For Habitt:

$$Q_{BE} = \frac{F + C}{P - V} = \frac{\text{Rs. 40million} + \text{Rs. 30million}}{\text{Rs. 2000} - \text{Rs. 1200}} = 87{,}500$$

For Machinesque:

$$Q_{BE} = \frac{F + C}{P - V} = \frac{\text{Rs. 75million} + \text{Rs. 30million}}{\text{Rs. 2000} - \text{Rs. 1000}} = 105{,}000$$

23. C is correct.

$$Q_{BE} = \frac{F + C}{P - V} = \frac{200 \text{ billion}}{(0.12 - 0.053)\text{million}} = 2.99 \text{ million}$$

24. B is correct.

$$Q_{OBE} = \frac{\text{Fixed cost}}{\text{Contribution margin}} = \frac{F}{P - V} = \frac{15{,}000}{15} = 1{,}000$$

25. B is correct. The operating breakeven point is:

$$Q_{OBE} = \frac{\text{Fixed cost}}{\text{Contribution margin}} = \frac{\$48{,}000}{\$24} = 2{,}000$$

26. C is correct.

$$Q_{OBE} = \frac{\text{Fixed cost}}{\text{Contribution margin}} = \frac{200{,}000}{20} = 10{,}000$$