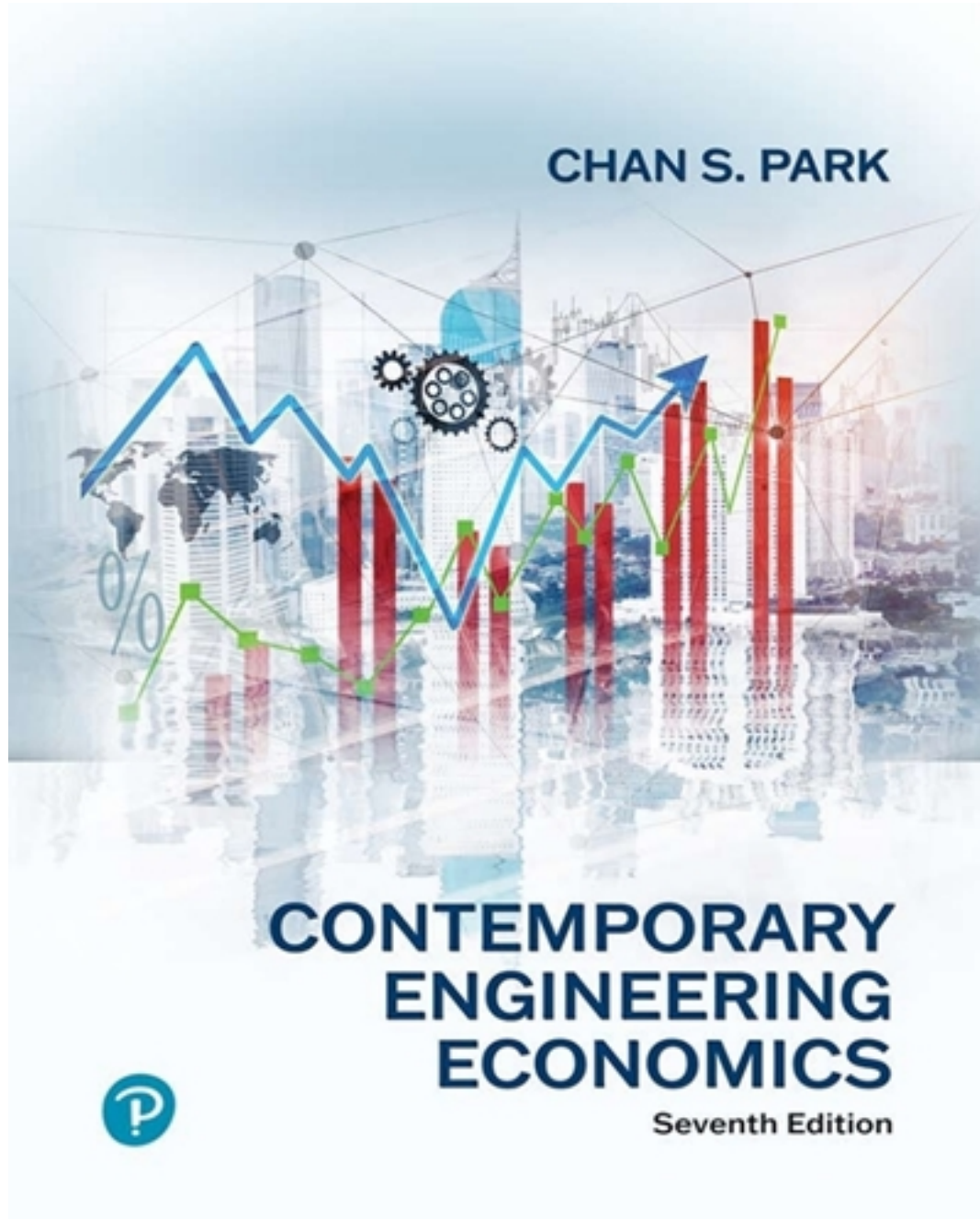


# Solutions for Contemporary Engineering Economics 7th Edition by Park

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# Solutions

## Chapter 2 Accounting Information for Engineering Economic Decisions

2.1

(2) Income statement; (1) balance sheet; (3) cash flow statement; (4) operating activities; (5) investing activities, and (6) financing activities; (7) capital account (paid-in capital)

2.2

(7), (8), (1), (11), (3), (9)

2.3

(a)

- Current assets = \$150,000 + \$200,000 + \$150,000 + \$50,000 + \$30,000  
= \$580,000
- Current liabilities = \$50,000 + \$100,000 + \$80,000 = \$230,000
- Working capital = \$580,000 - \$230,000 = \$350,000
- Shareholder's equity = \$100,000 + \$150,000 + \$150,000 + \$70,000  
= \$470,000

(b) EPS = \$500,000/10,000 = \$50 per share

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(c) Par value = \$15; capital surplus = \$150,000/10,000 = \$15

Market price = \$15 + \$15 = \$30 per share

2.4

(a) Shareholder's equity in 2021 = \$700 - \$510 = \$190(M)  
Shareholder's equity in 2022 = \$900 - \$640 = \$260(M)

(b) Net working capital in 2021 = \$100 - \$60 = \$40(M)  
Net working capital in 2022 = \$200 - \$90 = \$110(M)

(c) The income taxes in year 2022:

$(\$2,350 - \$1,130 - \$420 - \$210) \times 0.35 = \$206.5(M)$

(d)  $\$383.50 + \$420 = \$803.50 (M)$   
(Cash from Operating activities = Net income + Depreciation)

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2.5 (a)

|  | Company A | Company B |
|--|-----------|-----------|
| ROE (= Net income/Equity)  | 26.03%    | 22.29%    |
| ROA<br>(= Net income + interest expense (1-tax rate)/Average total assets) | 17.34%    | 12.59%    |

(b) Company A has performed better in terms of profitability.

(c) If two companies were merged, the impact on the results of ROE could be positive under the situation where the Company A leads the acquisition using a stock swap instead of issuing new stocks for M&A cost. If Company A uses a stock swap, the stock value wouldn't be decreased in terms of scarcity.

2.6

$$\begin{aligned}\text{Inventory turnover ratio (2021)} &= \text{Sales/Average inventory balance} \\ &= \$3,776,395 / (\$202,794 + \$231,313) \times 0.5 \\ &= 17.4 \text{ times}\end{aligned}$$

$$\text{Inventory turnover ratio (2022)} = 15.6 \text{ times}$$

This ratio shows how many times the inventory of a firm is sold and replaced over a specific period. From the data, Metronix was holding more stocks of inventory than last year; having more inventories on stock is unproductive.

2.7 (b)

2.8 (b)

2.9 (d)

2.10

Given Olson's EPS = \$8 per share; Cash dividend = \$4 per share; Book value per share = \$80; Changes in the retained earnings = \$24 million; Total debt = \$240 million; Find debt ratio = total debt/total assets

- $\text{EPS} = \frac{\text{Net Income}}{X} = \$8$   
Where X = the number of outstanding shares
- $\text{Book value} = \frac{\text{Total shareholders' equity}}{X} = \$80$

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- Retained earnings = Net income – Cash dividend; Net income = 8X from EPS relationship and the total cash dividend = 4X, so we rewrite  $8X - 4X = \$24$  million, or  $X = 6$  million shares
- From the book value per share, we know that the total shareholders' equity = 80X, or \$480 million; Total assets = Total liabilities + Total shareholders' equity = \$240 million + \$480 million = \$720 million
- Debt ratio = \$240 million/\$720 million = 0.33

2.11

(a) Debt ratio (= Total debt/Total assets)

$$= \$19,483,000/\$38,599,000 = 50.48\%$$

(b) Times-interest-earned ratio (= EBIT/Interest expense)

$$= \text{Not defined}$$

(c) Current ratio (= Current assets/Current liabilities)

$$= 29,021,000/19,483,000 = 1.49$$

(d) Quick (acid test) ratio (= (Current assets - Inventories)/Current liabilities)

$$= (29,021,000 - 1,301,000)/19,483,000 = 1.42$$

(d) Inventory-turnover ratio (= Sales/Avg. inventory balance)

$$= 61,494,000 / ((1,301,000 + 1,051,000) \times 0.5) = 52.29$$

(f) Days-sales-outstanding ratio (= Receivables/ (Annual sales/365))

$$= 10,136,000 / (61,494,000/365) = 60.16$$

(g) Total-assets-turnover ratio (= Sales/Total assets)

$$= 61,494,000/38,599,000 = 1.59$$

(h) Profit margin on sales (= Net income available to common stockholders/Sales)

$$= 2,635,000/61,494,000 = 4.28\%$$

(i) Return on total assets (= (Net income + interest expense (1-tax rate))/Avg. total assets)

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$$= 2,635,000 / ((38,599,000 + 33,652,000) \times 0.5) = 7.29\%$$

(j) Return on common equity (= (Net income available to common stockholders)/Avg. common equity)

$$= 2,635,000 / ((7,766,000 + 5,641,000) \times 0.5) = 39.31\%$$

(k) Price/earnings ratio (= Price per share/Earnings per share)

$$= 13.47 / (3,350,000 / 1,944,000) = 7.82$$

(l) Book value per share (= (Total stockholders' equity-Preferred stock)/Shares outstanding)

$$= 7,766,000 / 1,944,000 = \$3.99$$

To make an informed analysis of the firm's financial health, we need to calculate the various financial ratios of the firm's competitors along with the S&P 500.

2.12

Income Statement:

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| A         | B         | C         | D         | E         | F         |
|-----------|-----------|-----------|-----------|-----------|-----------|
| \$900,000 | \$585,000 | \$315,000 | \$270,000 | \$108,000 | \$162,000 |

Balance Sheet:

| ①         | ①         | ②         | ③         | ④         | ⑤           |
|-----------|-----------|-----------|-----------|-----------|-------------|
| \$160,000 | \$120,000 | \$320,000 | \$600,000 | \$900,000 | \$1,500,000 |

| ⑥         | ⑦         | ⑧         | ⑨         | ⑩         |
|-----------|-----------|-----------|-----------|-----------|
| \$450,000 | \$700,000 | \$100,000 | \$700,000 | \$800,000 |

- From Current ratio

$$\text{Total current assets} = 2.4 \times \$250,000 = \$600,000 \text{ ----- ③}$$

$$\text{Plant and equipment, net} = \$1,500,000 - \$600,000 = \$900,000 \text{ ----- ④}$$

- From Quick ratio

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$$\text{Inventory} = \$600,000 - (1.12 \times \$250,000) = \$320,000 \text{ -----} \textcircled{2}$$

- From Inventory Turnover

$$\text{Net Revenue} = ((\$320,000 + \$280,000)/2) \times 6.0 = \$1,800,000$$

$$\text{Cost of goods sold} = \$1,800,000 - \$900,000 = \$900,000 \text{ ----- A}$$

- From DSO

$$\text{Accounts receivable} = 24.3333 \times (\$1,800,000 \div 365) = \$120,000 \text{ -----} \textcircled{1}$$

$$\text{Cash} = \textcircled{3} - (\textcircled{2} + \textcircled{1}) = \$160,000 \text{ -----} \textcircled{o}$$

- From interest expense of income statement

$$\text{Bond} = \$450,000 \text{ -----} \textcircled{6}$$

$$250,000 + \textcircled{6} = \$700,000 \text{ -----} \textcircled{7}$$

- From Debt-to-Equity ratio

$$\text{Total Equity} \textcircled{10} = \$700,000 \div 0.875 = \$800,000 \text{ -----} \textcircled{10}$$

$$\text{Total assets or Total liabilities and equity} = \textcircled{7} + \textcircled{10} = \$1,500,000 \text{ -----} \textcircled{5}$$

- From Return on total assets

$$\text{Net income F} = 14\% \times (\$1,350,000) - (\$45,000) (0.6) = \$162,000$$

- From F,  $D = F \div 0.6 = \$270,000$ , TBEXAM.COM

$$E = D \times (0.4) = \$108,000$$

$$C = D + 45,000 = \$315,000$$

$$B = \$900,000 - C = \$585,000$$

- From EPS

$$\text{Stock Outstanding} = F \div 4.05 = 40,000 \text{ shares}$$

$$\text{Common stock} = \$2.50 \times 40,000 = \$100,000 \text{ -----} \textcircled{8}$$

$$\text{Retained Earnings} = \textcircled{10} - \textcircled{8} = \$700,000 \text{ -----} \textcircled{9}$$

2.13

- Accounts receivable = DSO  $\times$  Sales/365 = 45 days  $\times$  (\$1,200)/365 days = \$147.945
- Current assets = (Cash and marketable securities) + (Accounts receivable) + Inventory = \$427.945
- Long-term debt = (Total assets) – (Current liabilities) – (Common equities) = \$427.945 + \$280 – (current assets/current ratio) - \$500 = (\$207.945) – (427.945/3.2) = \$74.212
- Total assets turnover = Sales/Total assets = \$1,200/ (\$427.945 + \$280) = 1.695 times

2.14

- (a) Find Tiger's accounts receivable.

$$DSO = 91.25 = \frac{AR}{200,000 / 365} \Rightarrow AR = \$50,000$$

- (b) Determine the amount of current liabilities.

$$CA = \text{Cash} + \text{Inventory} + AR = \$10,000 + \$150,000 + \$50,000 = \$210,000$$

$$\text{Current Ratio} = 4.2 = \frac{\$210,000}{\text{Current Liabilities}} \Rightarrow \text{Current Liabilities} = \$50,000$$

- (c) Calculate the amount of the long-term debt.

$$\text{Total Asset} = \text{Current Asset} + \text{Fixed Asset} = \$210,000 + \$90,000 = \$300,000$$

$$\$300,000 = (\$50,000 + \text{Long term debt}) + \$200,000$$

$$\Rightarrow \text{Long term debt} = \$50,000$$

- (d) Calculate the Return on Common Equity.

$$ROE = \frac{\text{net income}}{\text{equity}} = \frac{\$15,000}{\$200,000} = 0.075 \Rightarrow 7.5\%$$

2.15

- (a) Find Fisher's accounts receivable.

$$DSO = \frac{AR}{1,200 / 365} \rightarrow AR = \mathbf{147.95M}$$

- (b) Calculate the amount of current assets.

$$CA = \text{cash} + \text{Inv.} + AR = 100 + 180 + 147.95 = \mathbf{427.95M}$$

- (c) Determine the amount of current liabilities.

$$CR = 3.2 = \frac{CA}{CL} = \frac{427.95}{CL} \rightarrow CL = \mathbf{133.73M}$$

- (d) Determine the amount of total assets.

$$TA = CA + FA = 427.95 + 280 = \mathbf{707.95M}$$

- (e) Calculate the amount of the long-term debt.

$$707.95 = (133.73 + LB) + 500 \rightarrow LB = \mathbf{74.22M}$$

- (f) Calculate the profit margin.

$$\text{profit margin} = \frac{\text{net income}}{\text{sales}} = \frac{358}{1,200} = \mathbf{29.83\%}$$

- (g) Calculate the Return on Common Equity

$$ROE = \frac{\text{net income}}{\text{equity}} = \frac{358}{500} = \mathbf{71.6\%}$$

## Short Case Studies with Excel

ST2.1

Not provided

ST2.2

- (a) Working capital = Current assets – Current liabilities

Working capital requirements = Changes in current assets – Changes in current liabilities:

$$WC \text{ req.} = (+\$100,000 - \$20,000) - (+\$30,000 - \$40,000) = \$90,000,$$

indicating that additional financing is needed to fund the increase in current assets.

(b) Taxable income = \$1,500,000 - \$650,000 - \$150,000 - \$20,000 = \$680,000

(c) Net income = \$680,000 - \$272,000 = \$408,000

- (d) Net cash flow:

- Operating activities = net income + depreciation – WC = \$408,000 + \$200,000 - \$90,000 = \$518,000
- Investing activities = equipment purchase = (\$400,000)
- Financing activities = borrowed fund = \$200,000
- Net cash flow = \$518,000 - \$400,000 + \$200,000 = \$318,000

ST2.3

Not provided

(Visit the websites and get the most recent financial statements available)