Answers to Concepts Review and Critical Thinking Questions

1. Liquidity measures how quickly and easily an asset can be converted to cash without significant loss in value. It’s desirable for firms to have high liquidity so that they have a large factor of safety in meeting short-term creditor demands. However, since liquidity also has an opportunity cost associated with it—namely that higher returns can generally be found by investing the cash into productive assets—low liquidity levels are also desirable to the firm. It’s up to the firm’s financial management staff to find a reasonable compromise between these opposing needs.

2. The recognition and matching principles in financial accounting call for revenues, and the costs associated with producing those revenues, to be “booked” when the revenue process is essentially complete, not necessarily when the cash is collected or bills are paid. Note that this way is not necessarily correct; it’s the way accountants have chosen to do it.

3. Historical costs can be objectively and precisely measured whereas market values can be difficult to estimate, and different analysts would come up with different numbers. Thus, there is a tradeoff between relevance (market values) and objectivity (book values).

4. Depreciation is a noncash deduction that reflects adjustments made in asset book values in accordance with the matching principle in financial accounting. Interest expense is a cash outlay, but it’s a financing cost, not an operating cost.

5. Market values can never be negative. Imagine a share of stock selling for –$20. This would mean that if you placed an order for 100 shares, you would get the stock along with a check for $2,000. How many shares do you want to buy? More generally, because of corporate and individual bankruptcy laws, net worth for a person or a corporation cannot be negative, implying that liabilities cannot exceed assets in market value.

6. For a successful company that is rapidly expanding, for example, capital outlays will be large, possibly leading to negative cash flow from assets. In general, what matters is whether the money is spent wisely, not whether cash flow from assets is positive or negative.

7. It’s probably not a good sign for an established company, but it would be fairly ordinary for a start-up, so it depends.

8. For example, if a company were to become more efficient in inventory management, the amount of inventory needed would decline. The same might be true if it becomes better at collecting its receivables. In general, anything that leads to a decline in ending NWC relative to beginning would have this effect. Negative net capital spending would mean more long-lived assets were liquidated than purchased.
9. If a company raises more money from selling stock than it pays in dividends in a particular period, its cash flow to stockholders will be negative. If a company borrows more than it pays in interest, its cash flow to creditors will be negative.

10. The adjustments discussed were purely accounting changes; they had no cash flow or market value consequences unless the new accounting information caused stockholders to revalue the derivatives.

Solutions to Questions and Problems

Basic

1. **Balance Sheet**
   - CA: $3,000
   - CL: $900
   - OE = $9,000 – 5,900 = $3,100
   - NFA: 6,000
   - LTD: 5,000
   - NWC = $3,000 – 900 = $2,100
   - TA: $9,000
   - OE = 3,100
   - TL + OE = $9,000

2. **Income Statement**
   - Sales: $432,000
   - Costs: 210,000
   - Depreciation: 25,000
   - EBIT: $197,000
   - Interest: 8,000
   - EBT: $189,000
   - Taxes: 66,150
   - Net income: $122,850

3. Net income = divs + add. to ret. earnings; add. to ret. earnings = $122,850 – 65,000 = $57,850

4. EPS = NI / shares = $122,850 / 30,000 = $4.10 per share
   - DPS = divs / shares = $65,000 / 30,000 = $2.17 per share

5. NWC = CA – CL; CA = $900K + 1.8M = $2.7M
   - Book value CA = $2.7M
   - Book value NFA = $1.6M
   - Book value assets = $2.7M + 1.6M = $4.3M
   - Market value CA = $2.9M
   - Market value NFA = $1.5M
   - Market value assets = $2.9M + 1.5M = $4.4M

6. Taxes = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($185K – 100K) = $55,400

7. Average tax rate = $55,400 / $185,000 = 29.95%; marginal tax rate = 39%
8. **Income Statement**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$9,750</td>
</tr>
<tr>
<td>Costs</td>
<td>5,740</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>$3,010</td>
</tr>
<tr>
<td>Interest</td>
<td>240</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$2,770</td>
</tr>
<tr>
<td>Taxes (35%)</td>
<td>969.50</td>
</tr>
<tr>
<td>Net income</td>
<td>$1,800.50</td>
</tr>
</tbody>
</table>

OCF = EBIT + Depreciation – Taxes = $3,010 + 1,000 – 969.50 = $3,040.50

9. **Net capital spending** = NFA<sub>end</sub> – NFA<sub>beg</sub> + depreciation = $3.5M – 3.1M + 850K = $1.25M

10. **Change in NWC**
    
    \[
    \text{Change in NWC} = (\text{CA}_\text{end} - \text{CL}_\text{end}) - (\text{CA}_\text{beg} - \text{CL}_\text{beg}) \\
    = (1,440 - 525) - (1,200 - 720) = 915 - 480 = 435
    \]

11. **Cash flow to creditors**
    
    = interest paid – net new borrowing = $400K – (LTD<sub>end</sub> – LTD<sub>beg</sub>)
    = $400K – ($3.6M – 3.1M) = $400K – 500K = −$100K

12. **Cash flow to stockholders**
    
    = dividends paid – net new equity = $500K – [(common<sub>end</sub> + APIS<sub>end</sub>) – (common<sub>beg</sub> + APIS<sub>beg</sub>)]
    = $500K – [($825K + 7.8M) – ($750K + 7.2M)]
    = $500K – [8.625M – 7.95M] = −$175K

13. **Cash flow from assets**
    
    = cash flow to creditors + cash flow to stockholders
    = −$100K – 175K = −$275K

    Cash flow from assets = −$275K = OCF – change in NWC – net capital spending
    = OCF – (−$195K) – 600K = −$275K

    Operating cash flow = −$275K – 195K + 600K = $130K

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**Intermediate**

14. **Income Statement**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$130,000</td>
</tr>
<tr>
<td>Costs</td>
<td>82,000</td>
</tr>
<tr>
<td>Other expenses</td>
<td>3,500</td>
</tr>
<tr>
<td>Depreciation</td>
<td>6,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>$38,500</td>
</tr>
<tr>
<td>Interest</td>
<td>14,000</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$24,500</td>
</tr>
<tr>
<td>Taxes (34%)</td>
<td>8,330</td>
</tr>
<tr>
<td>Net income</td>
<td>$16,170</td>
</tr>
</tbody>
</table>

OCF = EBIT + Depreciation – Taxes = $38,500 + 6,000 – 8,330 = $36,170

b. CFC = interest – net new LTD = $14,000 – (−6,000) = $20,000

c. CFS = dividends – net new equity = $6,400 – 2,830 = $3,570

d. CFA = CFC + CFS = $20,000 + 3,570 = $23,570

Net cap. sp. = inc. in NFA + depreciation = $5,000 + 6,000 = $11,000

Change in NWC = OCF – net cap. sp. – CFA
    = $36,170 − 11,000 − 23,570
    = $1,600
15. Net income = dividends + addition to ret. earnings = $800 + 4,000 = $4,800  
EBT = NI / (1 – tax rate) = $4,800 / 0.65 = $7,385  
EBIT = EBT + interest = $7,385 + 1,200 = $8,585  
Sales – costs = EBDIT = $21,000 – 10,000 = $11,000  
Depreciation = EBDIT – EBIT = 11,000 – 8,585 = $2,415  

16. Balance Sheet  
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$300,000</td>
<td>Accounts payable</td>
<td>$700,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>150,000</td>
<td>Notes payable</td>
<td>145,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>425,000</td>
<td>Current liabilities</td>
<td>$845,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current assets</td>
<td>$875,000</td>
<td>Long-term debt</td>
<td>1,300,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tangible net fixed assets</td>
<td>3,500,000</td>
<td>Intangible net fixed assets</td>
<td>775,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total assets</td>
<td>$5,150,000</td>
<td>Accumulated ret. earnings</td>
<td>2,150,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total liabilities</td>
<td>$2,145,000</td>
<td>Common stock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

?? = $5,150,000 – 2,150,000 – 2,145,000 = $855,000  

17. Owners’ equity = Max ((TA – TL), 0); if TA = $3,600, OE = $700; if TA = $2,300, OE = $0  

18. a. Taxes Growth = 0.15($50K) + 0.25($25K) + 0.34($5K) = $15,450  
Income = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($235K) + 0.34($8.665M)  
= $3,060,000  
b. Each firm has a marginal tax rate of 34% on the next $10,000 of taxable income, despite their different average tax rates, so both firms will pay an additional $3,400 in taxes.  

19. Income Statement  
<table>
<thead>
<tr>
<th></th>
<th>$900,000</th>
<th>b. OCF = EBIT + D – T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>900,000</td>
<td>= $25,000 + 105,000 – 0 = $130,000</td>
</tr>
<tr>
<td>COGS</td>
<td>600,000</td>
<td></td>
</tr>
<tr>
<td>A&amp;S expenses</td>
<td>170,000</td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>105,000</td>
<td></td>
</tr>
<tr>
<td>EBIT</td>
<td>$25,000</td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>85,000</td>
<td></td>
</tr>
<tr>
<td>Taxable income</td>
<td>($60,000)</td>
<td></td>
</tr>
<tr>
<td>Taxes (35%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>a. Net income</td>
<td>($60,000)</td>
<td></td>
</tr>
</tbody>
</table>

Net income was negative because of the tax deductibility of depreciation and interest expense. However, the actual cash flow from operations was positive because depreciation is a non-cash expense and interest is a financing, not an operating, expense.  

20. A firm can still pay out dividends if net income is negative; it just has to be sure there is sufficient cash flow to make the dividend payments.

Change in NWC = net cap. sp. = net new equity = 0. (Assumed)  
Cash flow from assets = OCF – change in NWC – net cap. sp. = $130K – 0 – 0 = $130K  
Cash flow to stockholders = dividends – net new equity = $25K – 0 = $25K  
Cash flow to creditors = cash flow from assets – cash flow to stockholders = $130K – 25K = $105K  
Net new LTD = interest – cash flow to creditors = $85K – 105K = –$20K
21. **Income Statement**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$12,200</td>
</tr>
<tr>
<td>Cost of good sold</td>
<td>$9,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$1,600</td>
</tr>
<tr>
<td>EBIT</td>
<td>$1,600</td>
</tr>
<tr>
<td>Interest</td>
<td>$200</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$1,400</td>
</tr>
<tr>
<td>Taxes (34%)</td>
<td>$476</td>
</tr>
</tbody>
</table>

**a. Net income**

Net income = $924

**b. OCF = EBIT + D – T**

OCF = $1,600 + $1,600 – $476 = $2,724

**c. Change in NWC**

\[ \text{Change in NWC} = \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} \]

**d. CFA = OCF – change in NWC – net cap.sp**

CFA = $2,724 – $800 – $2,000 = $-76

The cash flow from assets can be positive or negative, since it represents whether the firm raised funds or distributed funds on a net basis. In this problem, even though net income and OCF are positive, the firm invested heavily in both fixed assets and net working capital; it had to raise a net $76 in funds from its stockholders and creditors to make these investments.

22. **a. Total assets 2001 = $625 + $2,800 = $3,425; total liabilities 2001 = $245 + 1,400 = $1,645**

Owners’ equity 2001 = $3,425 – $1,645 = $1,780

Total assets 2002 = $684 + $3,100 = $3,784; total liabilities 2002 = $332 + $1,600 = $1,932

Owners’ equity 2002 = $3,784 – $1,932 = $1,852

**b. NWC 2001 = CA01 – CL01 = $625 – $245 = $380**

NWC 2002 = CA02 – CL02 = $684 – $332 = $352

Change in NWC 2002 = NWC02 – NWC01 = $352 – $380 = $-28

**c. Net cap. sp. = NFA02 – NFA01 + D02 = $3,100 – $2,800 + $700 = $1,000**

Net cap. sp. = fixed assets bought – fixed assets sold

$1,000 = $1,500 – fixed assets sold; fixed assets sold = $1,500 – $1,000 = $500

EBIT = Sales – costs – depreciation = $8,100 – 3,920 – $700 = $3,480

EBT = EBIT – interest = $3,480 – 212 = $3,268;

Tax = EBT × 0.35 = $3,268 × 0.35 = $1,143.80

OCF02 = EBIT + Dep – Taxes = $3,480 + $700 – $1,143.80 = $3,036.20

Cash flow from assets = OCF – inc. in NWC – net cap. sp.

= $3,036.20 – ($-28) – $1,000 = $2,064.20

**d. Net new borrowing = LTD02 – LTD01 = $1,600 – 1,400 = $200**

Cash flow to creditors = interest – net new LTD = $212 – $200 = $12

Net new borrowing = $200 = debt issued – debt retired; debt retired = $300 – $200 = $100
23. Net cap. sp. = NFA<sub>end</sub> - NFA<sub>beg</sub> + D
    = (NFA<sub>end</sub> - NFA<sub>beg</sub>) + (D + AD<sub>beg</sub>) - AD<sub>beg</sub>
    = (NFA<sub>end</sub> - NFA<sub>beg</sub>) + AD<sub>end</sub> - AD<sub>beg</sub>
    = (NFA<sub>end</sub> + AD<sub>end</sub>) - (NFA<sub>beg</sub> + AD<sub>beg</sub>) = FA<sub>end</sub> - FA<sub>beg</sub>

24. a. The tax bubble causes average tax rates to catch up to marginal tax rates, thus eliminating the
    tax advantage of low marginal rates for high income corporations.
    b. Taxes = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($235K) = $113.9K
    Average tax rate = 113.9K / 335K = 34%; Marginal tax rate on next dollar of income = 34%
    For corporate taxable income levels of $335K to $10M, average tax rates are equal to
    marginal tax rates.
    Taxes = 0.34($10M) + 0.35($5M) + 0.38($3.333M) = $6,416,667
    Average tax rate = 6,416,667 / 18,333,334 = 35%; Marginal tax rate on next dollar of income
    = 35%. For corporate taxable income levels over $18,333,334, average tax rates are again
    equal to marginal tax rates.
    c. Taxes = 0.34($200K) = $68K = 0.15($50K) + 0.25($25K) + 0.34($25K) + X($100K);
    X(100K) = 68K – 22.25K = 45.75K; X = 45.75K / 100K = 45.75%

25. **12/31/01 Balance Sheet**
    Cash $1,505 A/P $1,581
    A/R 1,992 N/P 291
    Inventory 3,542 CL $1,872
    CA $7,039 LTD 5,040
    NFA 12,621 OE 12,748
    TA $19,660 TL&E $19,660

    **12/31/02 Balance Sheet**
    Cash $1,539 A/P $1,533
    A/R 2,244 N/P 273
    Inventory 3,640 CL $1,806
    CA $7,423 LTD 5,880
    NFA 12,922 OE 12,659
    TA $20,345 TL&E $20,345

**2001 Income Statement**
Sales $2,870.00
COGS 987.00
Other expenses 238.00
Dep 413.00
EBIT $1,232.00
Interest 192.00
EBT $1,040.00
Tax (34%) 353.60
NI $686.40
Dividends $350.00
Add. to RE $336.40

**2002 Income Statement**
Sales $3,080.00
COGS 1,121.00
Other expenses 196.00
Dep 413.00
EBIT $1,350.00
Interest 221.00
EBT $1,129.00
Tax (34%) 383.86
NI $745.14
Dividends $385.00
Add. to RE $360.14
26. 2002: OCF = EBIT + Dep – T = $1,350 + 413 – 383.86 = $1,379.14

Change in NWC = NWC<sub>end</sub> – NWC<sub>beg</sub> = (CA – CL)<sub>end</sub> – (CA – CL)<sub>beg</sub>
= ($7,423 – 1,806) – ($7,039 – 1,872)
= $5,617 – 5,167 = $450

Net cap. sp. = NFA<sub>end</sub> – NFA<sub>beg</sub> + dep = $12,922 – 12,621 + 413 = $714

*: Cash flow from assets = OCF – change in NWC – net cap. sp.
= $1,379.14 – 450 – 714 = $215.14

Cash flow to creditors = interest – net new LTD;
net new LTD = LTD<sub>end</sub> – LTD<sub>beg</sub>
Cash flow to creditors = $221 – ($5,880 – 5,040) = –$619

Net new equity = common stock<sub>end</sub> – common stock<sub>beg</sub>
Common stock + retained earnings = total owners’ equity
Net new equity = (OE – RE)<sub>end</sub> – (OE – RE)<sub>beg</sub>
= OE<sub>end</sub> – OE<sub>beg</sub> + RE<sub>beg</sub> – RE<sub>end</sub>

RE<sub>end</sub> = RE<sub>beg</sub> + add. to RE02

*: Net new equity = OE<sub>end</sub> – OE<sub>beg</sub> + RE<sub>beg</sub> – (RE<sub>beg</sub> + add. to RE02)
= OE<sub>end</sub> – OE<sub>beg</sub> – ARE02

Net new equity = $12,659 – 12,748 – 360.14 = –$449.14

CF to stockholders = div – net new equity = $385 – (–449.14) = $834.14

As a check, cash flow from assets = $215.14
= cash flow from creditors + cash flow to stockholders
= –$619 + $834.14 = $215.14