Financial Management

FINA 2010, Semester II, 2020-2021

Assignment 5 (Solution)

8 February, 2021

1. Questions from Chapter 10 of the text book (Page 341, Concepts Review and Critical Thinking Questions)

Q2: For tax purposes, a firm would choose MACRS because it provides for larger depreciation deductions earlier. These larger deductions reduce taxes, but have no other cash consequences. Notice that the choice between MACRS and straight-line is purely a time value issue; the total depreciation is the same, only the timing differs.

Q5: The EAC approach is appropriate when comparing mutually exclusive projects with different lives that will be replaced when they wear out. This type of analysis is necessary so that the projects have a common life span over which they can be compared; in effect, each project is assumed to exist over an infinite horizon of N-year repeating projects. Assuming that this type of analysis is valid implies that the project cash flows remain the same forever, thus ignoring the possible effects of, among other things: (a) inflation, (b) changing economic conditions, (c) the increasing unreliability of cash flow estimates that occur far into the future, and (d) the possible effects of future technology improvement that could alter the project cash flows.

2. Questions from Chapter 10 of the text book (Page 342, Questions and Problems)

Q7: The asset has an eight-year useful life and we want to find the BV of the asset after five years. With straight-line depreciation, the depreciation each year will be:

Annual depreciation = $680,000/8

Annual depreciation = $85,000

So, after five years, the accumulated depreciation will be:

Accumulated depreciation = 5($85,000)

Accumulated depreciation = $425,000

The book value at the end of Year 5 is thus:

BV_5 = $680,000 – 425,000

BV_5 = $255,000

The asset is sold at a loss to book value, so the depreciation tax shield of the loss is recaptured.

Aftertax salvage value = $143,000 + ($255,000 – 143,000)(.21)

Aftertax salvage value = $166,520

To find the taxes on salvage value, remember to use the equation:

Taxes on salvage value = (BV – MV)T_C

This equation will always give the correct sign for a tax inflow (refund) or outflow (payment).

Q9: Using the tax shield approach to calculating OCF (remember the approach is irrelevant; the final answer will be the same no matter which of the four methods you use), we get:

OCF = (Sales – Costs)(1 – T_C) + T_C(Depreciation)
OCF = ($1,735,000 – 650,000)(1 – .21) + .21($2,320,000/3)

OCF = $1,019,550

Q25: To find the bid price, we need to calculate all other cash flows for the project, and then solve for the bid price. The aftertax salvage value of the equipment is:

Aftertax salvage value = $450,000(1 – .23)

Aftertax salvage value = $346,500

Now we can solve for the necessary OCF that will give the project a zero NPV. The current aftertax value of the land is an opportunity cost, but we also need to include the aftertax value of the land in five years since we can sell the land at that time. The equation for the NPV of the project is:

$$NPV = 0 = -\$5,100,000 - 1,125,000 - 425,000 + OCF(PVIFA_{10\%,5}) - \$50,000(PVIFA_{10\%,4}) + \{(\$346,500 + 425,000 + 4(50,000) + 1,295,000]/1.10^5\}$$

Solving for the OCF, we find the OCF that makes the project NPV equal to zero is:

OCF = $5,401,175.09/$PVIFA_{10\%,5}$

OCF = $1,424,816.38

The easiest way to calculate the bid price is the tax shield approach, so:

OCF = $1,424,816.38 = [(P – v)Q – FC](1 – T_C) + T_CD

$1,424,816.38 = [(P – $.0038)(100,000,000) – $1,100,000](1 – .23) + .23($5,100,000/5)

P = $.03026

Q27: Since we need to calculate the EAC for each machine, sales are irrelevant. EAC only uses the costs of operating the equipment, not the sales. Using the bottom-up method, or net income plus depreciation, to calculate OCF, we get:

	Machine A	Machine B

Variable costs	–$4,550,000	–$3,900,000
Fixed costs	–210,000	–245,000
Depreciation	–483,333	–644,444
EBT	–$5,243,333	–$4,789,444
Tax	1,258,400	1,149,467
Net income	–$3,984,933	–$3,639,978
+ Depreciation	483,333	644,444
OCF	–$3,501,600	–$2,995,533

The PV of costs and EAC for Machine A are:

PV of costs_A = –$2,900,000 – $3,501,600($PVIFA_{10\%,6}$)

PV of costs_A = –$18,150,380.87

EAC_A = –$18,150,380.87/($PVIFA_{10\%,6}$)

EAC_A = –$4,167,461.40

And the PV of costs and EAC for Machine B are:

PV of costs_B = –$5,800,000 – 2,995,533($PVIFA_{10\%,9}$)

PV of costs_B = –$23,051,347.81

EAC_B = –$23,051,347.81/($PVIFA_{10\%,9}$)

EAC_B = –$4,002,648.46

You should choose Machine B since it has a less negative EAC.

Q34: We will begin by calculating the aftertax salvage value of the equipment at the end of the project's life. The aftertax salvage value is the market value of the equipment minus any taxes paid (or refunded), so the aftertax salvage value in four years will be:

Taxes on salvage value = (BV – MV)T_C

Taxes on salvage value = ($0 – 395,000)(.22)

Taxes on salvage value = –$86,900

Market price	$395,000
Tax on sale	–86,900
Aftertax salvage value	$308,100

Now we need to calculate the operating cash flow each year. Using the bottom up approach to calculating operating cash flow, we find:

	Year 0	Year 1	Year 2	Year 3	Year 4
Revenues		$2,167,500	$2,465,000	$2,720,000	$1,997,500
Fixed costs		345,000	345,000	345,000	345,000
Variable costs		325,125	369,750	408,000	299,625
Depreciation		883,245	1,177,925	392,465	196,365
EBT		$614,130	$572,325	$1,574,535	$1,156,510
Taxes		135,109	125,912	346,398	254,432
Net income		$479,021	$446,414	$1,228,137	$902,078
OCF		$1,362,266	$1,624,339	$1,620,602	$1,098,443
Capital spending	–$2,650,000				$308,100
Land	–2,100,000				2,300,000
NWC	–125,000				125,000
Total cash flow	–$4,875,000	$1,362,266	$1,624,339	$1,620,602	$3,831,543

Notice the calculation of the cash flow at Time 0. The capital spending on equipment and investment in net working capital are both cash outflows. The aftertax selling price of the land is also a cash outflow. Even though no cash is actually spent on the land because the company already owns it, the aftertax cash flow from selling the land is an opportunity cost, so we need to include it in the analysis. The company can sell the land at the end of the project, so we need to include that value as well. With all the project cash flows, we can calculate the NPV, which is:

$$NPV = -\$4,875,000 + \$1,362,266/1.13 + \$1,624,339/1.13^2 + \$1,620,602/1.13^3 + \$3,831,543/1.13^4$$

$$NPV = \$1,075,756.44$$

The company should accept the new product line.

3. The difference between a firm's future cash flows if it accepts a project and the firm's future cash flows if it does not accept the project is referred to as the project's:
A. incremental cash flows.
B. internal cash flows.
C. external cash flows.
D. erosion effects.
E. financing cash flows.

4. The fact that a proposed project is analyzed based on the project's incremental cash flows is the assumption behind which one of the following principles?
A. underlying value principle
B. stand-alone principle
C. equivalent cost principle
D. salvage principle
E. fundamental principle

5. Which one of the following costs was incurred in the past and cannot be recouped?
A. incremental
B. side
C. sunk
D. opportunity
E. erosion

6. The option that is foregone so that an asset can be utilized by a specific project is referred to as which one of the following?
A. salvage value
B. wasted value
C. sunk cost
D. opportunity cost
E. erosion

7. The depreciation tax shield is best defined as the:
A. amount of tax that is saved when an asset is purchased.
B. tax that is avoided when an asset is sold as salvage.
C. amount of tax that is due when an asset is sold.
D. amount of tax that is saved because of the depreciation expense.
E. amount by which the aftertax depreciation expense lowers net income.

8. Danielle's is a furniture store that is considering adding appliances to its offerings. Which of the following should be considered incremental cash flows of this project?
I. utilizing the credit offered by a supplier to purchase the appliance inventory
II. benefiting from increased furniture sales to appliance customers
III. borrowing money from a bank to fund the appliance project
IV. purchasing parts for inventory to handle any appliance repairs that might be necessary
A. I and II only
B. III and IV only
C. I, II, and IV only
D. II, III, and IV only
E. I, II, III, and IV

9. Which one of the following is an example of a sunk cost?
A. $1,500 of lost sales because an item was out of stock
B. $1,200 paid to repair a machine last year
C. $20,000 project that must be forfeited if another project is accepted
D. $4,500 reduction in current shoe sales if a store commences selling sandals
E. $1,800 increase in comic book sales if a store commences selling puzzles

10. The bid price is:
A. an aftertax price.
B. the aftertax contribution margin.
C. the highest price you should charge if you want the project.
D. the only price you can bid if the project is to be profitable.
E. the minimum price you should charge if you want to financially breakeven.

11. Which one of the following will increase a bid price?
A. a decrease in the fixed costs
B. a reduction in the net working capital requirement
C. a reduction in the firm's tax rate
D. an increase in the salvage value
E. an increase in the required rate of return

12. Changes in the net working capital requirements:
A. can affect the cash flows of a project every year of the project's life.
B. only affect the initial cash flows of a project.
C. only affect the cash flow at time zero and the final year of a project.
D. are generally excluded from project analysis due to their irrelevance to the total project.
E. reflect only the changes in the current asset accounts.

13. Pro forma statements for a proposed project should:
I. be compiled on a stand-alone basis.
II. include all the incremental cash flows related to the project.
III. generally exclude interest expense.
IV. include all project-related fixed asset acquisitions and disposals.
A. I and II only
B. II and III only
C. I, II, and IV only
D. II, III, and IV only
E. I, II, III, and IV

14. A company that utilizes the MACRS system of depreciation:
A. will have equal depreciation costs each year of an asset's life.
B. will have a greater tax shield in year two of a project than it would have if the firm had opted for straight-line depreciation, given the same depreciation life.
C. can depreciate the cost of land, if it so desires.
D. will expense less than the entire cost of an asset.
E. cannot expense any of the cost of a new asset during the first year of the asset's life.

15. Morris Motors just purchased some MACRS 5-year property at a cost of $216,000. Which one of the following will correctly give you the book value of this equipment at the end of year 2?

MACRS 5-year property	
Year	Rate
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

A. $216,000/(1 + 0.20 + 0.32)
B. $216,000 × (1 - 0.20 - 0.32)
C. $216,000 × (0.20 + 0.32)
D. [$216,000 × (1 - 0.20)] × (1 - 0.32)
E. $216,000/[(1 + 0.20)(1 + 0.32)]

16. Increasing which one of the following will increase the operating cash flow assuming that the bottom-up approach is used to compute the operating cash flow?
A. erosion effects
B. taxes
C. fixed expenses
D. salaries
E. depreciation expense

17. Decreasing which one of the following will increase the acceptability of a project?
A. sunk costs
B. salvage value
C. depreciation tax shield
D. equivalent annual cost
E. accounts payable requirement

18. Kelly's Corner Bakery purchased a lot in Oil City 6 years ago at a cost of $280,000. Today, that lot has a market value of $340,000. At the time of the purchase, the company spent $15,000 to level the lot and another $20,000 to install storm drains. The company now wants to build a new facility on that site. The building cost is estimated at $1.47 million. What amount should be used as the initial cash flow for this project?

A. -$1,470,000
B. -$1,810,000
C. -$1,825,000
D. -$1,845,000
E. -$1,860,000

CF_0 = -$340,000 - $1,470,000 = -$1,810,000

19. Cool Comfort currently sells 300 Class A spas, 450 Class C spas, and 200 deluxe model spas each year. The firm is considering adding a mid-class spa and expects that if it does it can sell 375 of them. However, if the new spa is added, Class A sales are expected to decline to 225 units while the Class C sales are expected to decline to 200. The sales of the deluxe model will not be affected. Class A spas sell for an average of $12,000 each. Class C spas are priced at $6,000 and the deluxe model sells for $17,000 each. The new mid-range spa will sell for $8,000. What is the value of the erosion?

A. $600,000
B. $1,200,000
C. $1,800,000
D. $2,400,000
E. $3,900,000

Erosion = [(300 - 225) × $12,000] + [(450 - 200) × $6,000] = $2,400,000

20. Northern Railway is considering a project which will produce annual sales of $975,000 and increase cash expenses by $859,000. If the project is implemented, taxes will increase from $141,000 to $154,000 and depreciation will increase from $194,000 to $272,000. The company is debt-free. What is the amount of the operating cash flow using the top-down approach?

A. $25,000
B. $103,000
C. $157,000
D. $181,000
E. $209,000

OCF = $975,000 - $859,000 - ($154,000 - $141,000) = $103,000

21. A proposed expansion project is expected to increase sales of JL Ticker's Store by $35,000 and increase cash expenses by $21,000. The project will cost $24,000 and be depreciated using straight-line depreciation to a zero book value over the 4-year life of the project. The store has a marginal tax rate of 30 percent. What is the operating cash flow of the project using the tax shield approach?
A. $5,600
B. $7,800
C. $11,600
D. $13,300
E. $14,600

OCF = ($35,000 - $21,000) (1 - 0.30) + ($24,000/4) (0.30) = $11,600

22. Bernie's Beverages purchased some fixed assets classified as 5-year property for MACRS. The assets cost $87,000. What will the accumulated depreciation be at the end of year three?

MACRS 5-year property

Year	Rate
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

A. $13,520
B. $25,056
C. $38,241
D. $48,759
E. $61,944

Depreciation = $87,000 × (0.20 + 0.32 + 0.192) = $61,944

23. Jasper Metals is considering installing a new molding machine which is expected to produce operating cash flows of $73,000 a year for 7 years. At the beginning of the project, inventory will decrease by $16,000, accounts receivables will increase by $21,000, and accounts payable will increase by $15,000. All net working capital will be recovered at the end of the project. The initial cost of the molding machine is $249,000. The equipment will be depreciated straight-line to a zero book value over the life of the project. The equipment will be salvaged at the end of the project creating a $48,000 aftertax cash flow. At the end of the project, net working capital will return to its normal level. What is the net present value of this project given a required return of 14.5 percent?
A. $77,211.20
B. $79,418.80
C. $82,336.01

D. $84,049.74
E. $87,925.54

CF_0 = -$249,000 + $16,000 - $21,000 + $15,000 = -$239,000
CO_7 = $73,000 + $48,000 - $16,000 + $21,000 - $15,000 = $111,000

$$NPV = -\$239,000 + \$73,000 \times \left[\frac{1 - \frac{1}{(1+0.145)^6}}{0.145} \right] + \frac{\$111,000}{(1+0.145)^7} = \$84,049.74$$

24. Home Furnishings Express is expanding its product offerings to reach a wider range of customers. The expansion project includes increasing the floor inventory by $430,000 and increasing its debt to suppliers by 70 percent of that amount. The company will also spend $450,000 for a building contractor to expand the size of its showroom. As part of the expansion plan, the company will be offering credit to its customers and thus expects accounts receivable to rise by $90,000. For the project analysis, what amount should be used as the initial cash flow for net working capital?
A. -$39,000
B. -$70,000
C. -$156,000
D. -$219,000
E. -$391,000

NWC requirement = -$430,000 + (0.70 × $430,000) - $90,000 = -$219,000