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Q1

a. Initial cost (I) = $40,000
Salvage Value (S) = $8,000
Period (N) = 5

Annual depreciation allowances $(Dn) = \frac{(I-S)}{N}$

$$D_5 = \frac{40,000 - 8,000}{5}$$

$$\boxed{D_5 = \$6,400}$$

b. Book Value calculations

| N | $D_N$ | $BV_N$ |
|---|---|---|
| 0 | — | $40,000 |
| 1 | $6,400 | $33,600 |
| 2 | $6,400 | $27,200 |
| 3 | $6,400 | $20,800 |
| 4 | $6,400 | $14,400 |
| 5 | $6,400 | $8,000 |

Q2

a) $\alpha = 1/N$ (multiplier)

b) $= \frac{1}{5}(2) = 0.4$ I = $150,000 S = $15,000

| N | $\alpha$ | $D_N$ | $BV_N$ |
|---|---|---|---|
| 1 | 0.4 | $60,000 | $90,000 |
| 2 | 0.4 | $36,000 | $54,000 |
| 3 | 0.4 | $21,600 | $32,400 |
| 4 | 0.4 | $12,960 | $19,440 |
| 5 | 0.4 | $7,776 | $11,664 |

Q2.

c. The salvage value is higher than the depreciation value at end of year 5.

$$BV_5 < S$$

This is a violation in the taxation law. The depreciation needs to be adjusted for the final year.

Q3.

a&b)

| N | MACRS | $D_N$ | $BV_N$ |
|---|---|---|---|
| 0 | - | - | $45,000 |
| 1 | 20% | $9,000 | $36,000 |
| 2 | 32% | $14,400 | $21,600 |
| 3 | 19.2% | $8,640 | $12,960 |
| 4 | 11.52% | $5,184 | $7,776 |
| 5 | 11.52% | $5,184 | $2,592 |
| 6 | 5.76% | $2592 | 0 |

S = $10,000

c) Capital Gains/Loss = Salvage Value − Book Value

= $10,000 − $2,592

= $7,408

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Q4. Investment (I) = $900,000
Income (A) = $300,000 + 5% / year
Expenses = $90,000 + 7% / year
Period (N) = 5 years
Loan = 10% of I at 11% interest
MARR = 12%
Corporate Tax = 30%
Salvage Value (S) = $50 000

(a)

Sol Depreciation =

| N | MACRS | $D_N$ | $BV_N$ |
|---|---|---|---|
| 0 | | | $900,000 |
| 1 | 20% | $180,000 | $720,000 |
| 2 | 32% | $288,000 | $432,000 |
| 3 | 19.2% | $172,800 | $259,200 |
| 4 | 11.52% | $103,680 | $155,520 |
| 5 | 11.52% | $103,680 | $51,840 |
| 6 | 5.76% | $51,840 | — |

(b)

AE calculation:
AE = $90,000 at 11% for 6 years
= $21,273.89

Loan Payment calculation

| Year | Beginning Balance | Interest Payment | Principle Payment | Ending Balance |
|---|---|---|---|---|
| 1 | $90,000 | $9,900 | $11,373.89 | $78,626.11 |
| 2 | $78,626.11 | $8,648.87 | $12,625.02 | $66,001.09 |
| 3 | $66,001.09 | $7,260.12 | $14,013.77 | $51,987.32 |
| 4 | $51,987.32 | $5,718.61 | $15,555.29 | $36,432.03 |
| 5 | $36,432.03 | $4,007.52 | $17,266.37 | $19,165.57 |
| 6 | $19,165.57 | $2,108.22 | $19,165.67 | — |

Gain / Loss.

Taxable Gain (Loss) = 51,840 - 50000

= $1840

∵ Salvage Value < Book Value (Tax = 30%)

∴ Tax to be paid = $552.00

Income Statement

| Year | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Revenue | $300,000 | $321,000 | $343,470 | $367,513 | $393,239 | $420,766 |
| Expenses | $90,000 | $94,500 | $99,225 | $104,186 | $109,396 | $114,865 |
| Debt interest | $9,900 | $8,649 | $7,260 | $5,719 | $4,008 | $2,108 |
| Taxable Income | $200,100 | $217,851 | $236,985 | $257,608 | $279,836 | $303,792 |
| Income Tax | $60,030 | $65,355 | $71,095 | $77,282 | $83,951 | $91,138 |
| Net Income | $140,070 | $152,496 | $165,889 | $180,326 | $195,885 | $212,654 |

Cash Flow

| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Net Income | | $140,070 | $152,496 | $165,889 | $180,326 | $195,885 | $212,654 |
| Depreciation | | $180,000 | $288,000 | $172,800 | $103,680 | $103,680 | $51,840 |
| Investment | (-$900,000) | | | | | | |
| Salvage | | | | | | | $50,000 |
| Gains/Loss | | | | | | | (-$552) |
| Borrowed | $90,000 | | | | | | |
| Principle | | (-$11,374) | (-$12,625) | (-$14,014) | (-$15,555) | (-$17,266) | (-$19,166) |
| Net Cash Flow | (-$810,000) | $308,696 | $427,871 | $324,676 | $268,450 | $282,299 | $294,777 |

PW = (-P) + 308,696 (P|F, 12%, 1) + 427,871 (P|F, 12%, 2) + 324,676 (P|F, 12%, 3) + 268450 (P|F, 12, 4) + 282299 (P|F, 12, 5) + 294,777 (P|F, 12, 6)

= $517,924.78 (> 0 Accept)

IRR = 34% (> 12% Accept)

This project is very justifiable at given interest rates & gains. Accept it.