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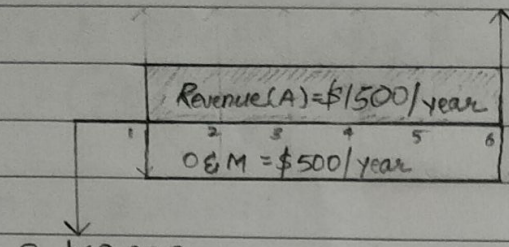
Q1.



Investment (I) = $60,000
Revenue (R) = $1500/year
Period (N) = 6 years
O&M = $500/year
Salvage (S) = $17,000
Effective (R - OM) = $1000/year.

Q2. Total Amount = $500,000

Down Payment = 15% of total Amount

$$= \frac{15}{100} \times 500,000$$

$$= 75,000$$

Pending Amount = $425,000

Option 1.

10% with 25 years

∴ Monthly payment = $ 3,861.98 [From Excel]

Option 2:

11% with 35 years

∴ Monthly payment = $ 3,982.07 [From Excel]

25 years with 10% is a better option.

Q3

P = $90,000

N = 48

I = 12% = 1% (monthly)

Monthly payment = $2,370.05

Amount to be paid after 20th installment = $57,631.07

Q4

PV = 1900

FV = 2100

Interest $= i_m$ = 10.53% = $\left(\frac{200}{1900} \times 100\right)$

Nominal Rate $(r) = i_m \times M$

= 126%

Effective Interest Rate $= \left(1 + \frac{r}{m}\right)^m - 1$

= 232%

Q5.

Alternative A

a

PW = $-P + A(P/A, i, N) + F(P/F, i, N)$

$= -460,000 + 48000\,(P/A, 10, 7) + 115000\,(P/F, 10, 7)$

$= -460,000 + 48,000\,(4.8684) + 115000\,(0.5132)$

$= (-167,298.8)$

$AW = -P(A/P, i, N) + A + F(A/F, i, N)$

$= -460,000\,(A/P, 10, 7) + 48,000 + 115,000\,(A/F, 10, 7)$

$= -460,000\,(0.2054) + 48,000 + 115,000\,(0.1054)$

$= (-34,363)$

FW = $-P(F|P,i,N) + A(F|A,i,N) + F$
$= -460000\,(1.9487) + 48000\,(9.4872) + 115000$
$= (-326,016.4)$

Alternative B

PW = $-P + A(P|A,i,N) + F(P|F,i,N)$
$= -480,000 + 35000\,(4.8684) + 160000\,(0.5132)$
$= (-227,494)$

AE = $-P(A|P,i,N) + A + F(A|F,i,N)$
$= -480000\,(0.2054) + 35000 + 160000\,(0.1054)$
$= (-46,728)$

FW = $-P(F|P,i,N) + A(F|A,i,N) + F$
$= -480000\,(1.9487) + 35000\,(9.4872) + 160000$
$= (-443,324)$

As alternative A's PW < alternative B's PW, Alternative A is a better plan.

Q6

Investment = $70,000
Expenses = $40,000
Revenue = $60,000
Effective (A) = $20,000
N = 12 years
MARR = 20%
Salvage = $9,000

Q6 contd

$CR = (1-S)(A/P, i, N) + S$

$= (-87,798.70)$

$OM = \$20,000$

$EUAC = CR + O\&M$

$= (-67,798.70)$

Q7.

$P = -700,000$

$A = \$190,000$

$N = 10$

Guess 1 (20%)	Guess 2 (25%)
$PW = -P + A(P/A, i, N)$	$PW = -P + A(P/A, i, N)$
$= -700,000 + 190,000\ (P/A, 20\%, 10)$	$= -700000 + 190000\ (P/A, 25\%, 10)$
$= -700000 + 190000\ (4.1925)$	$= -700000 + 190000\ (3.5705)$
$= \$96,575$	$= (-21,605)$

Interpolation

$$y = y_1 + \frac{(x - x_1)(y_2 - y_1)}{(x_2 - x_1)}$$

$$y = 20 + \frac{(+96575)(5)}{(-118180)}$$

$y = 24.09\%$

Q8

→ Alternative A

B = $3,250,000
C' = $400,000
I = $15,000,000

PW of B
= A (P|A, 12%, 50)
= 3,250,000 × 8·3045
= $26,989,620.09

PW of C'
= A (P|A, 12%, 50)
= $ 3,321,799·40

PW of C = I + C'
= $ 18,321,799·40

BCR = B/C
= 1·47
BCR > 1 ∴ Accept

Alternative B

B = $4,850,000
C' = $550,000
I = $22,000,000

PW of B
= A (P|A, 12, 50)
= 4,850,000 × 8·3045
= $40,276,817·67

PW of C'
= A (P|A, 12, 50)
= $ 4,567,474·17

PW of C = I + C'
= $ 26,567,474·17

BCR = B/C
= 1·51
BCR > 1 ∴ Accept

$$BCR(i)_{B-A} = \frac{B_B - B_A}{C_B - C_A}$$

= 1·61

∵ $BCR(i)_{B-A} > 1$

Select Alternative B.

Q9. $I = \$32,000$ $\alpha = \frac{1}{N}(2) = 0.4$

$S = \$6,500$ $Dn = \left(\frac{I-S}{N}\right)$ for straight line & $Dn = \alpha I(1-\alpha)^{n-1}$ for DDB

$N = 5$

Straight line method × DDB method

n	Dn	BVn	α	Dn	BVn
0	-	$32,000	-	-	$32,000
1	$5,100	$26,900	0.4	$12,800	$19,200
2	$5,100	$21,800	0.4	$7,680	$11,520
3	$5,100	$16,700	0.4	$4,608	$6912
4	$5,100	$11,600	0.4	$2,764.80	$4,147.20
5	$5,100	$6,500	0.4	$1,658.88	$2,488.32

Q10 $P = \$50,000$ Expense = $300

$i = 13\%$ $S = \$9,000$

$N = 2$ Income Tax = 30%

$A = \$5,000$ MARR = 18%

Working Capital = $13,000

$AE = \$29,974.18$

Loan Payment

Year	Beginning Balance	Interest Payment	Principle Payment	Ending Balance
1	$50,000	$6,500	$23,474.18	$26,525.82
2	$26,525.82	$3,448.36	$26,525.82	-

Q10 continued

Depreciation Table:

n	MACRS	Dn	BVn
0			$50,000
1	45%	$22,000	$27,000
2	55%	$27,500	-

Capital Gain/Loss.

BV = 0

S = $9000

S > BV ∴ Taxable Gain = S - BV

= $9000

Tax rate = 30%

∴ Capital Gain/Loss = 30% of 9000 = $2,700

Income Statement

Year	1	2
Revenue	$5000	$5000
Expenses:		
- Cash	$300	$300
- Depreciation	$22,500	$27,500
- Interest Payment	$6,500	$3448.36
Taxable Income	$24,300	$26248.36
Income Tax	$7,290	$7,874.51
Net Income	$17,010	$18,373.85

Cash Flow

Year	0	1	2
Operating Activities			
- Net Income		(-$17,010)	(-$18,373.85)
- Depreciation		$22,500	$27,500
Investment Activities			
- Investment	0		
- Salvage			$9000
- Gains Tax			(-$2,700)
- Working Capital	(-$13,000)		
Financing Activities			
- Borrowed	$50,000		
- Loan Repayment		(-$23,474.18)	(-$26525.82)
Net Cash Flow	$37,000	(-$17984.18)	(-$11,099.67)

Present Worth = (-$69,618.94)

Bad investment.

IRR – Excel