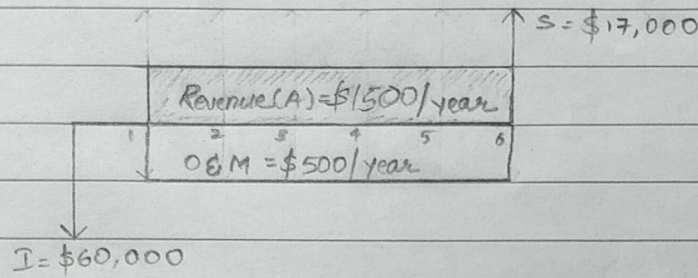


(1)

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 11% is a better option.

Q3

$$P = \$90,000$$

$$N = 48$$

$$I = 12\% = 1\% \text{ (monthly)}$$

$$\text{Monthly Payment} = \$2,370.05$$

$$\text{Amount to be paid after 20th installment} = \$57,631.07$$

Q4

$$PV = 1900$$

$$FV = 2100$$

$$\text{Interest} = \frac{(FV - PV)}{PV} \times 100 = \left(\frac{200}{1900} \times 100 \right)$$

$$\begin{aligned} \text{Nominal Rate } (r) &= i_m \times M \\ &= 12\% \end{aligned}$$

$$\begin{aligned} \text{Effective Interest Rate} &= \left(1 + \frac{r}{m} \right)^m - 1 \\ &= 232\% \end{aligned}$$

Q5.

Alternative A

a

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

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

$$= -460,000 + 48,000 (4.8684) + 115,000 (0.5132)$$

$$= (-167,298.8)$$

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

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

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

$$= (-34,363)$$

$$\begin{aligned}
 FW &= -P(F|P, i, N) + A(F|A, i, N) + F \\
 &= -460000(1.9487) + 48000(9.4872) + 115000 \\
 &= (-326,016.4)
 \end{aligned}$$

Alternative B

$$\begin{aligned}
 PW &= -P + A(P|A, i, N) + F(P|F, i, N) \\
 &= -480,000 + 35000(4.8684) + 160000(0.5132) \\
 &= (-227,494)
 \end{aligned}$$

$$\begin{aligned}
 AE &= -P(A|P, i, N) + A + F(A|F, i, N) \\
 &= -480000(0.2054) + 35000 + 160000(0.1054) \\
 &= (-46,728)
 \end{aligned}$$

$$\begin{aligned}
 FW &= -P(F|P, i, N) + A(F|A, i, N) + F \\
 &= -480000(1.9487) + 35000(9.4872) + 160000 \\
 &= (-443,324)
 \end{aligned}$$

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

Q6

$$\begin{aligned}
 \text{Investment} &= \$70,000 \\
 \text{Expenses} &= \$40,000 \\
 \text{Revenue} &= \$60,000 \\
 \text{Effective (A)} &= \$20,000 \\
 N &= 12 \text{ years} \\
 \text{MARR} &= 20\% \\
 \text{Salvage} &= \$9,000
 \end{aligned}$$

Q6
contd

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

$$= (-87,798.70)$$

$$OM = \$20,000$$

$$EVAL = CR + OM$$

$$= \underline{\underline{(-67,798.70)}}$$

Q7.

$$P = -700,000$$

$$A = \$190,000$$

$$N = 10$$

Guess 1 (20%)

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

$$= -700,000 + 190,000(P/A, 20\%, 10)$$

$$= -700,000 + 190,000(4.1925)$$

$$= \$96,575$$

Guess 2 (25%)

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

$$= -700,000 + 190,000(P/A, 25\%, 10)$$

$$= -700,000 + 190,000(3.5705)$$

$$= (-21,605)$$

Interpolation

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

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

$$\underline{\underline{y = 24.09\%}}$$

(5)

Q8

→ Alternative A

$$B = \$3,250,000$$

$$C' = \$400,000$$

$$I = \$15,000,000$$

PW of B

$$= A(P/A, 12\%, 50)$$

$$= 3,250,000 \times 8.3045$$

$$= \$26,989,620.09$$

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

$$= A(P/A, 12\%, 50)$$

$$= 4,850,000 \times 8.3045$$

$$= \$40,276,817.67$$

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

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

$$= 1.61$$

$$\therefore BCR(i)_{B-A} > 1$$

Select Alternative B.

(6)

Q9.

$$I = \$32,000$$

$$\alpha = \frac{1}{N}(2) = 0.4$$

$$S = \$6,500$$

$$D_n = \left(\frac{I-S}{N}\right) \text{ for straight line \& } D_n = \alpha I(1-\alpha)^{n-1} \text{ for DDB}$$

$$N = 5$$

Straight line method

x

DDB method

n	D _n	BV _n		α	D _n	BV _n
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	\$6,912
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. → In Excel "Rushabh - Barbhaya - Midterm - xlsx"