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Subject : Engineering and
management

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Q1 (a)

A property dealer in Hayatabad township has an option to purchase a twenty marla plot that will be worth Rs. 100 million in six years. If the value of the plot increases at 8%, how much the property dealer is willing to pay for this property?

Sol:

$$P = F \left(\frac{1}{1+j} \right)^n$$

$$= 100m (1 + 0.08)^6$$

$$= 100m (0.92)^6$$

$$= 100m (0.6063)$$

$$= 6.63m$$

Q 1 Part (b)

MR. Hamza an employee of 1980 national university of retirement from service received a lump sum amount of Rs. 10 million. He wishes to distribute to his four children at the rate of Rs. one million per year. if the 10 million amount are deposited in a bank account that earn 6% interest per year. How many years it will it take to completely deplet the account?

Sol:

As we know that

$$P = A \left[\frac{(1+i)^n - 1}{i(1+i)^n} \right]$$

$$10m = 1m \left[\frac{(1+0.06)^n - 1}{0.06(1+0.06)^n} \right]$$

$$10 = \left[\frac{(1.06)^n - 1}{0.06(1.06)^n} \right]$$

$$10 \times (0.06(1.06)^n) = (1.06)^n - 1$$

$$0.6(1.06)^n = (1.06)^n - 1$$

$$1 = (1.06)^n - 0.6(1.06)^n$$

$$1 = (1.06)^n (1 - 0.6)$$

$$\frac{1}{0.4} = (1.06)^n$$

$$\ln 2.5 = n \times \ln(1.06)$$

$$0.916 = n \times 0.0583$$

$$N = \frac{0.916}{0.0583}$$

$$N = 15.7 \text{ years}$$

Q No 2 (a)

for Generator installed at Turbela Dam, if undergoes a major overhaul now, its output can be increased by 30% - which translate into additional cash flow of Rs 30 million at the end of each year for five years. if interest rate is

15% per year, how much can the Wapda afford to invest to overhaul these generators?

Sol.

Given Data

$$A = 30 \text{ millions}$$

$$N = 5 \text{ years}$$

$$i = 15\% \rightarrow 0.15$$

we know that

$$P = A \frac{[1+i]^n - 1}{i} \quad \text{--- (1)}$$

$$P = \frac{30 \text{ m} (1 + 0.15)^5 - 1}{0.15 (1 + 0.15)^5}$$

$$P = \frac{30 \text{ m} (2.011 - 1)}{0.15 (2.011)}$$

$$P = \frac{30 \text{ m} (1.011)}{0.30165}$$

$$P = 30 \text{ m} (3.3525)$$

$$P = \text{Rs } 100.575 \text{ millions Ang}$$

Q2(b)

Suppose Mr. Zafar makes 15 equal annual deposits of \$10,000 each into Summit Bank account paying 5% interest per year. The first deposit will be made one year from today. How much money can be withdrawn from this bank account immediately after the 15th deposit?

Sol.

Given Data

$$A = \$10,000$$

$$N = 15$$

$$i = 5\% \Rightarrow 0.05$$

we know that

$$F = A \left[\frac{1+i}{i} \right]^n - 1 \quad (1)$$

put in eq (1)

$$\begin{aligned} F &= 10,000 \left[\frac{1+0.05}{0.05} \right]^{15} - 1 \\ &= 10,000 [2.0] - 1 / 0.05 \end{aligned}$$

$$= 10,000 [21.5]$$

$$F = \$215,700 \text{ Ans}$$

Q No 3 (a)

A property is depreciable if it meets certain basic requirements. What are those basic requirements.

Ans.

Property is depreciable if it meets the following basic requirements.

~~1) it must have a useful life & the life must be longer than one year.~~

~~2) it must have a useful life~~

1) it must be used in business or held to produce income

2) it must have useful life & the life must be longer than one year

3) it must be something that

wears out, decays gets used up, become obsolete or loss value from natural causes.

Q 3 (b)

An MRI machine was installed at Khyber teaching hospital Peshawar year 2018 at an initial cost of Rs 400,000 and expected to have zero salvage value at the end of useful life of 10 years. Determine the annual depreciation amount using SYD method. tabulate the annual depreciation amount and the book value of the air condition at the end of each year.

Sol-

From

$$d_v = (B - S_v n) \left[\frac{2(N - k + 1)}{N(N+1)} \right]$$

$$B_{v k} = B - \left[\frac{2 - (B - S_v n)}{N} \right] k + \left[\frac{B - S_v n}{N(N+1)} \right] k(k+1)$$

Putting value.

$$d_1 = 400000 \left[\frac{2(10+1-1)}{10(10+1)} \right]$$

$$d_2 = 400000 \left[\frac{2(10)}{10(11)} \right]$$

$$d_1 = 400000(0.1818)$$

$$d_1 = 72720$$

Bv, =

$$400000 = \left[\frac{2(400000)}{10} \times 1 \right] + \left[\frac{400000}{10(11)} \right] (11)$$

$$\Rightarrow 400000 [80000] + \left[\frac{400000}{110} \right] \times 2$$

$$400000 - 80000 + 7272.7$$

$$\Rightarrow 327272.3$$

For d_2

$$d_2 = 400000 \left[\frac{2(10-2+1)}{10(10+1)} \right]$$

$$d_2 = 400000 \left[\frac{2(9)}{110} \right]$$

$$d_2 = 400000 \left[\frac{18}{110} \right]$$

$$d_2 = 6545.4$$

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$$400000 - \left[-2 \left(\frac{400000}{10} \right) \right] \times 2 + \left[\frac{400000}{10(1)} \right] \times 3$$

$$400000 - [160000 + 3636.36 \times 6]$$

$$\Rightarrow 261818.16$$

Q No 4) (A)

A Company buys a Digital Controlled (Dc) machine for \$28,000 (year Zero) and uses it for five years, after which time it is scrapped. The allowed depreciation deduction during the first year is \$4,000. The equipment falls into the seven-year MACRS-property category. (The first-year depreciation rate is 14.29%) The cost of the good produced by this Dc machine should include a charge for the depreciation of the machine. Suppose the company estimate the following revenues and expenses, including

the depreciation for the first operating year:

Gross income = \$50,000;

Cost of good sold = \$20,000;

Depreciation on the machine = \$4,000

operating expenses = \$6,000

if the company pay taxes at the rate of 40% on its taxable income what is its net income during the first year from the project?

Sol.

Gross income & expenses as

stated; income - tax rate = 40%

find

net income

Consider the purchase of the machine to have been made at the end of year zero which is also the beginning of year one.

Note that our example explicitly assumes that have only depreciation

charges for year one are those for the Dc machine, a situation that may not be typically)

item	amount
Gross income (Revenue)	\$50,000
Expenses	
Cost of good sold	\$ 20,000
Depreciation	\$ 2,000
operating expenses	\$ <u>6,000</u>
taxable income	\$ 20,000
taxes (40%)	\$ <u>8,000</u>
Net income	12,000

Q4 (b)

Solution.

BENEFITS:

Improvement of the image of the area of abbotabad city.

- potential to attract conference & convention to abbotabad city.

- Potential to attract professional Sports franchises to the city
- ~~franchise~~ Revenues from rental of the facility.
- Uses of facility of civic events.

Costs:

Architectural design of the facility, construction of the facility. Design & construction of parking facility. facility operating and maintenance costs, insurance cost.

Disbenefit:

loss of use of portion of the park, bike path natural trail, & the pond, loss of wildlife habitat in urban area.

PNOS (a)

First to determine The equivalent AW of all costs at the MARR of 12% / year to earn exactly 12%. The annual rental income, adjusted for 90% occupancy, must equal the AW of costs.

initial investment costs:

$$= \$50,000 + \$225,000$$

$$= \$275,000$$

Taxes and insurance per year =

$$0.1 (\$275,000)$$

$$= \$27,500$$

upkeep/year:

$$= \$30(12 \times 30)(0.9)$$

$$= \$9720$$

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CR cost/year

$$\begin{aligned} & \$275,000 (A/P, 12\%, 20) - \$50,000 \\ & \quad (A/F, 12\%, 20) \end{aligned}$$

$$= \$36,125$$

(Assume That investment in land is recovered at the year of 20)

Equivalent AW (of costs):

$$\$275,000 - \$9720 - \$36125$$

$$= \$73343$$

Therefore minimum annual rental required equals \$73343 and with annual compounding, the monthly rental amount R is

$$= \$73343 / (12 \times 30) (0.9)$$

$$= \$226.36 \text{ Any}$$

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