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SUBJECT # ENGR MANAGEMENT

DEPARTMENT # BEE

SEMESTER # 8<sup>th</sup>

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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?

Solution

$$\begin{aligned}
 P &= F \left( \frac{1}{1+j} \right)^n \\
 &= 100m \left( \frac{1}{1+0.08} \right)^6 \\
 &= 100m (0.92)^6 \\
 &= 100m (0.6063) \\
 &= 60.63m.
 \end{aligned}$$

Q1

(b)

MR. Hamza an employee of Iqba National University on retirement from service received a lump sum amount of Rs 10 million. He wishes to distributed to his four children at the rate of Rs. one million per year. If the 10 million amounts are deposited in a bank account the earns 6% interest

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Per year. how many years it will  
it take to completely deplete  
the account?

Solution:-

As we know that

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

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

$$10 = \frac{(1.06)^n - 1}{0.06(1.06)^n}$$

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

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

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

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

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

$$2.5 = (1.06)^n$$

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

$$0.916 = n \times 0.0583$$

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

$$n = 15.7 \text{ years.}$$

Q2 a) Four generators installed at Turbela Dam, if undergoes a major overhaul now it, a output can be increased by 30% which translate 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 generations?

**SOLUTION:**

Given data:

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

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

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

We know that

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

Putting values in eq(1)

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

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

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

$$P = 30m(3.3525)$$

$$P = \text{₱ } 100.575 \text{ millions Ans.}$$

Q2 b) Suppose Mr Zafar make 15 equal annual deposits of \$ 10,000 each in to summit bank account paying 5% interest per year. The first deposit will be made one year from today. How much money can be withdrawn n from this bank account immediately after the 15<sup>th</sup> deposit?

**SOLUTION :**

Given data :

$$A = \$ 10,000$$

$$N = 15$$

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

We know that :

$$F = A[1+i]^n - 1/i \quad (1)$$

Putting values in eq (1)

$$F = 10,000[1+0.05]^{15} - 1/0.05$$

$$= 10,000[2.07] - 1/0.05$$

$$= 10,000[21.57]$$

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

Q3(a) :- A property is depreciable if it meets certain basic equipments what are those basic requirements?

Ans:- Property is depreciable if it meets the following basic requirements.

- \* It must be used in business or held to produce income.
- \* It must have a useful life & the life must be longer than one year.
- \* It must be something that wears out, decays, gets used up, becomes obsolete or loses value from natural causes.

Q3  
(b)

An MRI-machine was installed at Kyber teaching hospital Peshawar in year 2018 at an initial cost of Rs 400,000 & expected to have zero salvage value at the end of useful life of 10 years. Determine the annual depreciation amounts & the book value of the asset condition at the end of each year.

Solution :-

We know that

From

$$dv = (B - sun) \left[ 2 \frac{(n-k+1)}{n(n+1)} \right]$$

$$Bvk = B - \left[ 2 \frac{(B - sun)}{n} \right] k + \left[ \frac{(B - sun)}{n(n+1)} \right] k(k+1)$$

Putting value for sample (1)

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

$$d_1 = 400000 \left[ 2 \frac{(10)}{10(11)} \right]$$

$$d_1 = 400000 (0.1818)$$

$$d_1 = 72720$$

By

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

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

$$400000 - 80000 + 7272.7$$

$$\Rightarrow 327272.3$$



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For  $d_2$

$$d_2 = 400000 \left[ \frac{2(10-2+1)}{20(10+1)} \right]$$

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

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

$$d_2 = 6545.45$$

$BV_2 =$

$$400000 - \left[ \frac{-2(400000)}{10} \right] \times 2 + \left[ \frac{400000}{10(11)} \right] \times 3$$

$$40000 - \left\{ 160000 + 3636.36 \times 6 \right.$$

$$\Rightarrow 261818.16$$

Q4(a) A company buys a digital controlled (DC) machine for \$28,000 (year zero) & uses it for five years after which time it is scrapped. The allowed depreciation deduction during the first year MACRS-property category (The first year depreciation rate is 14.29%). The cost of the goods produced by the DC machine should include a charge for the depreciation of the machine. Suppose the company estimates the following revenues & expenses, including the depreciation for the first operating year.

Gross income = \$50,000;

Cost of gold sold = \$20,000;

Depreciation on DC 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?

Given:-

Gross income & expenses as stated;  
income-tax rate = 40%

Finding:-

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

Item	amount
Gross income (Revenues)	\$50,000
Expenses	<del>                    </del>
cost of good sold	\$ 20,000
Deptecciation	\$ 2,000
opetating expenses	\$ 6,000
Taxable income	\$ 20,000
Taxes (40%)	\$ 8,000
Net income	12,000

Q4(b) A new convention centres & sport complex has been proposed to ADA in Abbotabad. This public project, if approved will be financed through the issues of bonds. The facility will be located near the city in a

wooded area, which includes a bike path, a nature trail and a pond. Because the city already owns the park, no purchase of land is necessary. List the projects benefits, costs, & any disbenefits.

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.
- 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.

### Disbenefits :-

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

Q5a) Star Marketing Company is considering building a 30-unit apartment complex in Regi-model-town. Because of the long term growth potential of the town, it is left that Star Marketing Company could average 90% of full occupancy for the complex year. If the following items are reasonable accurate estimates, what is the minimum monthly rent that should be charged if a 12% MARR (per year) is desired? Use the AW method.

Land investment cost	\$ 50,000
Building investment cost	\$ 225,000
study period	\$ 20 years
upkeep expenses per unit per month	\$ 30
property taxes and insurance per year	10% of the total investment

## SOLUTION:

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 cost:

$$\begin{aligned}
 &= \$50,000 + \$225,000 \\
 &= \$275,000
 \end{aligned}$$

Taxes and insurance per year =

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

$$= \$ 27,500$$

upkeep/Year :

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

$$= \$ 9720$$

CR cost/Year =

$$\$ 275,000 (A/P, 12\%, 20) - \$ 50,000 (A/F, 12\%, 20)$$

$$= \$ 36,123$$

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

Equivalent AW (of costs) =

$$\$ 275,000 - \$ 9720 - \$ 36123$$

$$= - \$ 73343$$

$$= - \$ 73343$$

Therefore minimum annual rental required equals \$73343 and with

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annual amount compounding, the monthly rental  
R is

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

$$= \$ 226.36 \text{ Ans}$$