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Engineering Management and Economics

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Final Term examination

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Question # 01

(a) Solution:-

Land = 20 marla plot

Wooth = 100 million in six years

8% increasing rate.

As we know that

$$P = F(1/1+i)^n$$

$$P = 100,0000000 \left[\frac{1}{1+0.08}\right]^6$$

$$P = 100\,m\,(1.08)^6$$

$$P = 100m \times 1.5868$$

$$\boxed{P = 158.68 \text{ million}}$$

(b) Lump sum amount of Rs 10 million

Distribution to his four children is Rs 1 million per year

$i = 6\%$ per year

How many years it will take to completely deplete the account?

As we know that

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

$$100 = \left[\frac{(1+0.06)^n - 1}{0.06(1+0.06)^n}\right]$$

$$100 = \left[\frac{(1.06)^n - 1}{0.06(1.06)^n}\right]$$

$$100 \times 0.06(1.06)^n = (1.06)^n - 1$$

$$6(1.06)^n = (1.06)^n - 1$$

$$1 = (1.06)^n - 6(1.06)^n$$

$$1 = (1.06)^n [1-6]$$

$$1 = (1.06)^n [-5]$$

$$1/-5 = (1.06)^n$$

(3)

$0.2 = (1.06)^n$

Now,

$$\ln(0.2) = n \times \ln(1.06)$$

$$-1.6094 = n \times 0.0583$$

$$N = \frac{-1.6094}{0.0583}$$

$$\boxed{N = 27.60 \text{ years}}$$

Question #02

(a) As we know that the formula is

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

From the question

$A = 30$ Million.

$N = 5$ years

$i = 15\%$ per year

Putt the values.

$$P = 300000000\left[\frac{(1+0.15)^5 - 1}{0.15(1+0.15)^5}\right]$$

$$P = 300000000\left[\frac{(1.15)^5 - 1}{0.15(1.15)^5}\right]$$

$$P = 300000000\left[\frac{1.01135}{0.30170}\right]$$

$$P = 300000000 \times 3.35217$$

$$P = 100565651000$$

(b) As we know about the formula

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

From the question

$A = 10,000$

$n = 15$ years

$i = 5\%$

Putt the values.

$$F = 10,000\left[\frac{(1+0.05)^{15} - 1}{0.05}\right]$$

$$F = 10,000\left[\frac{(1.05)^{15} - 1}{0.05}\right]$$

$$F = 10,000\left[\frac{1.0789}{0.05}\right]$$

$P = 10,000 \times 21.578$

$\boxed{P = 215780\$}$

Question # 03

(a) Answer:-

If the property is depriciable if it meets the following basic requirements.

i) It must be used in bussiness to produce a enough income.

ii) It must have a useful life and the life must be longer than one year.

iii) It must be something

that wears out decays, gets used up, becomes obsolute or loss value from natural causes.

(8) (8)

Question # 03

Part (b):-

We know that from

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

$$Bvk = B - \left[\frac{2(B-SvN)}{N}\right]k + \left[(B-SvN)/N(N+1)\right]^{k(k+1)}$$

putting value for sample (1)

$$d1 = 400000\left[\frac{2(10+1-1)}{10(10+1)}\right]$$

$$d1 = 400000\left[\frac{2(10)}{10(11)}\right]$$

$$d1 = 400000\,(0.1818)$$

$$d1 = 72720$$

$$Bv1 = 400000 - \left[\frac{2(400000)}{10} \times 1\right] + \left[\frac{400000}{10(11)}\right]1(1+1)$$

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

$$400000 - 80000 + 7272.7$$

$$\Rightarrow 327272.7$$

For d_2

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

$$d_2 = 400000\left[\frac{2(8+1)}{10(11)}\right]$$

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

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

$$d_2 = 65454.5$$

$$BV_2 = 400000 - \left[\frac{2(400000)}{10}\right] \times 2 + \left[\frac{400000}{10(11)}\right] 2 \times 3$$

$$\Rightarrow 400000 - 80000 \times 2 + \left[\frac{400000}{110}\right] \times 6$$

(10)

$= 400000 - 160000 + 3636.36 \times 6$

$= 400000 - 160000 + 2118.16$

$\Rightarrow \boxed{261818.16}$

Question # 04

(a) Solution:-

Gross income and expenses as stated; income tax rate is 40%

Net income = ?

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

Note that this example explicitly assumes that the only depreciation charges for year one are those for the DC machine, a situation that may not be typical

(12)

	Item	Amount
i)	Gross income (Revenues)	$ 50,000
ii)	Expenses	
iii)	Cost of good sold	$ 20,000
iv)	Depreciation	$ 2,000
v)	Operating expenses	$ 6,000
vi)	Texable income	$ 20,000
vii)	Texes (40%)	$ 8,000
	Net income	$ 12,000

(b) Benefits

Improvement of the image of the area of Abbo Habad city

Potential to attract conferences and conventions to Abbotabad city.

Potential to attract professional sports franchisis to the city

Revenues from rental of the facility.

Use of facility for civic events

Costs:-

Architechtural design of the facility, construction of the facility, design and construction of parking facility, facility operating

and maintainance costs, insurance costs.

Disbenefits:-

loss of use of portion of the park, bike path natural trial, and the pond. Loss of wildlife habitat in urban area.

Question # 5

First of all we determine the equivalent AW of all costs at the MARR of 12%/year to earn exactly 12%, the anual rental income adjusted for 90% occupancy must be equal the AW of cost

Initial investment cost = $50,000 + $225,000 = $275,000

Texes per year = 0.1(275,000) = $27,500

un keep/year = 30(12.30)(0.9) = $9720

CR cost/year = $275000(A/P, 12%, 20) - $50,000(A/F, 12%, 20)

= $36,123

Now assume that investment in land is recovered at the year of 20

Equivalent AW (of costs) = $275000 - $9720 - $36,123 = - $73,343

therefore, minimum annual rental required is $73,343 and with annual compounding the monthly rental amount R is

$$R = \frac{\$73,343}{(12 \cdot 30)(0.9)}$$

$$R = \frac{\$\ 73,343}{324}$$

$$\boxed{R = \$\ 226.367}$$