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Paper **Engineering management**

QND 1 (A) Part.

Solution:-

We know that,

$$P = F(1/1+i)^n \rightarrow \textcircled{1}$$

So putting values in eq (1)
we get

$$P = 100M (1/1+0.08)^6$$

$$P = 100M (1/1.08)^6$$

$$P = 100M (0.6300637658)$$

$$P = 63.0064M \text{ Ans}$$

(B) Part:

$$A = 10000$$

$$i = 5\% = 0.05$$

$$N = 15 \text{ Years}$$

Solution:-

As we know that

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

putting values

$$F = 10000 \left[\frac{(1+i)^n - 1}{i} \right]$$

$$F = 10000 \left[\frac{(1+0.05)^{15} - 1}{0.05} \right]$$

$$F = 10000 [21.5786]$$

$$F = 215786 \$ \text{ Ans.}$$

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QNO2: A

Given data:

$$A = 30,000,000$$

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

$$i = 15\%$$

We know that:

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

$$P = 30,000,000 \left[\frac{(1+0.15)^5 - 1}{0.15(1.15)^5} \right]$$

$$P = 30,000,000 \left[\frac{(1.15)^5 - 1}{0.15(1.15)^5} \right]$$

$$P = 30,000,000 (2.01 - 1/0.302)$$

$$P = 30,000,000 [1.01/0.302]$$

$$P = 30,000,000 \times 3.344$$

$$\boxed{P = 100,320,000 \text{ PKR}} \text{ Ans.}$$

(B) part:

Suppose Mr Zaffar make 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 How much money can be withdrawn from this bank account immediately after the 15th deposit?

Solution,

Given that:

$$A = 10,000$$

$$N = 15 \text{ years}$$

$$i = 5\%$$

So now we know that,

$$F = A [(1+i)^n - 1/i] \rightarrow \textcircled{1}$$

putting values in eq (1)

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

$$F = 10,000\$ \times 21.5786$$

$$F = 215786 \$$$

Q3 A part:

Answer:

A property is depreciable if it meets the following basic requirements

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

Q3 B Part

dep

We have formula

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

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

$$10+9+8+7+6+5+4+3+2+1 = 55$$

$$\text{Year 1} = \frac{10}{55} = 18.18\%$$

$$\text{" 2} = \frac{9}{55} = 16.36\%$$

$$\text{" 3} = \frac{8}{55} = 14.54\%$$

$$\text{" 4} = \frac{7}{55} = 12.72\%$$

$$\text{" 5} = \frac{6}{55} = 10.91\%$$

$$\text{" 6} = \frac{5}{55} = 9.09\%$$

$$\text{" 7} = \frac{4}{55} = 7.27\%$$

$$\text{" 8} = \frac{3}{55} = 5.45\%$$

$$\text{" 9} = \frac{2}{55} = 3.636\%$$

$$\text{" 10} = \frac{1}{55} = 1.818\%$$

Calculation for 4 year.

$$B = 400,000$$

$$sv_n = 0$$

$$k = 4$$

$$N = 10$$

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

$$= 400,000 - 0 \left[\frac{2(10-4+1)}{10(10+1)} \right]$$

$$400,000 \left[\frac{14}{110} \right] = 50909.09$$

$$\begin{aligned}
 BV_{10} &= B - [2(B - sv_n)/N]K + (B - sv_n)/N(N+1)]K \\
 &= 400,000 - [2(400,000)/10]4 + 400,000/10(10+1)(4K) \\
 &= 400,000 - 320,000 + 72727.2 \\
 &= 152727.2
 \end{aligned}$$

calculation for 1K

$$\begin{aligned}
 &400,000 [2(10 - (1) + 1)/10(10+1)] \\
 &400,000 [2(10/10)]
 \end{aligned}$$

$$d_1 = 72727.27$$

$$\begin{aligned}
 BV_1 &= 400,000 - [2(400,000)/10]1 + (400,000/10)(1+1) \\
 &= 400,000 - [80,000] + 7272.72
 \end{aligned}$$

$$BV_1 = 327272.72$$

t	$d_t K$	BV_t
0	72727.27	400,000
1	65455.55	327,272.73
2	58182.82	261,818.18
3	50909.09	203,636.36
4	50909.09	152,727.27
5	43636.36	109,091.91
6	36364.64	72727.27
7	29091.91	43636.36
8	21818.18	21818.18
9	14545.45	7272.73
10	7272.73	0

(Q4) A Part:

Given data:

Gross income and expenses is
income tax rate = 40%.

Find Net income?

Solution: Consider the purchase of machine to have been made the end of year is zero.

Gross income	=	\$ 20,500
Depreciation	=	\$ 2,000
operating expense	=	\$ 6,000
Taxes (40%)	=	\$ 8,000
Taxable income	=	\$ 20,000

Net income = \$ 2,000 Ans.

(Q4 → B part. Answer:-)



Benefits:- ① Improvement of the image of the area of Abbottabad city

- 12) Potential to attract conferences and convention to Abbottabad city.
- 13) Revenues from rental facility.
- 14) Use of facility for civic events.

Costs: Architectural design of the facility construction of the facility, Design and construction of parking facility.

Dis-Benefits:- Losses of use of portion of the park, bike path, natural trail and the pond, also loss of wildlife in urban area.

Q5 (A) Part:

Star Marketing Company is considering building a 30 unit apartment complex in Regs town. Because of the long term growth potential of the town it is felt that star marketing company could average 90% of full occupancy for the complex each year. If the following items are reasonably 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 = \$50,000

Building investment cost = \$225,000

Up Keep expenses per unit month = \$30

Property taxes and insurance per year = 10%

Study period = 20 years.

Solution:

First of all we determined 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 be equal the AW of cost.

$$\begin{aligned} \text{Initial investment cost} &= \$50,000 + \$225,000 \\ &= \$275,000 \end{aligned}$$

$$\text{Taxes per year} = 0.1(\$275,000) = \$27,500$$

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$$\text{Un keep/year} = \$30(12 \cdot 30)(0.9) = \$9720$$

$$\begin{aligned} \text{CR cost/year} &= \$275,000(\text{MP}, 12\%, 20) - \$50,000(\text{A/F}, 12\%, 20) \\ &= \$36,123 \end{aligned}$$

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

$$\begin{aligned} \text{Equivalent AW (of costs)} &= -27500 - \$9720 - \$36,123 \\ &= -\$73,343. \end{aligned}$$

there fore minimum annual rental required equals \$73,343 and with annual compounding, the monthly rental amount R is

$$R = \$73,343 / (12 \cdot 30)(0.9)$$

$$R = \$73343 / 324$$

$$\boxed{R = \$226.367} \text{ Answer.}$$