6. Solution: C

Cost of the perpetuity $= v \cdot (Ia)_{\overline{n}|} + \dfrac{n \cdot v^{n+1}}{i}$

$$= v \cdot \left[\frac{\ddot{a}_{\overline{n}|} - nv^n}{i}\right] + \frac{n \cdot v^{n+1}}{i}$$

$$= \frac{a_{\overline{n}|}}{i} - \frac{nv^{n+1}}{i} + \frac{nv^{n+1}}{i}$$

$$= \frac{a_{\overline{n}|}}{i}$$

Given $i = 10.5\%$,

$$\frac{a_{\overline{n}|}}{i} = \frac{a_{\overline{n}|}}{0.105} = 77.10 \Rightarrow a_{\overline{n}|} = 8.0955, \text{ at } 10.5\%$$

$$\therefore n = 19$$

Tips:

Helpful analysis tools for varying annuities: draw picture, identify "layers" of level payments, and add values of level layers.

In this question, first layer gives a value of 1/i (=PV of level perpetuity of 1 = sum of an infinite geometric progression with common ratio v, which reduces to 1/i) at 1, or v (1/i) at 0

2^{nd} layer gives a value of 1/i at 2, or v^2 (1/i) at 0

....

n^{th} layer gives a value of 1/i at n, or v^n (1/i) at 0

Thus 77.1 = PV = (1/i) (v + v^2 + ... v^n) = (1/.105) $a_{\overline{n}|.105}$

n can be easily solved for using BA II Plus or BA 35 Solar calculator