

11. Solution: A

Value of initial perpetuity immediately after the 5<sup>th</sup> payment (or any other time) =  $100 (1/i) = 100/.08 = 1250$ .

Exchange for 25-year annuity-immediate paying  $X$  at the end of the first year, with each subsequent payment increasing by 8%, implies

1250 (value of the perpetuity) must =

$X (v + 1.08 v^2 + 1.08^2 v^3 + \dots + 1.08^{24} v^{25})$  (value of 25-year annuity-immediate)

$= X (1.08^{-1} + 1.08 (1.08)^{-2} + 1.08^2 (1.08)^{-3} + 1.08^{24} (1.08)^{-25})$

(because the annual effective rate of interest is 8%)

$= X (1.08^{-1} + 1.08^{-1} + \dots + 1.08^{-1}) = X [25(1.08^{-1})]$ .

So,  $1250 (1.08) = 25 X$  or  $X = 54$