Assignment on Bond valuation

FV Rs 10,000 to be redeemed at par on maturity coupon rate 8.5%

Year to Maturity → 5 years
YTM = 10%
you are required to calculate:
(i) current market price of the Bond
(ii) Macaulay's Duration
(iii) Volatility of the Bond.
(iv) Convexity of the Bond.
(v) Expected Market-price, if there is a decrease in the YTM by 200 basis points.
(a) By Macaulay's Duration.
(b) Using the Present value Method.

years	1	2	3	4	5
PVIF(10%,n)	0.909	0.826	0.751	0.683	0.621
PVIF(8%,n)	0.926	0.857	0.794	0.735	0.681

Macaulay's Duration

The Macaulay's duration is the weighted average term to maturity of the cash flows from a bond.

The weight of each cash flow is determined by dividing the present value of the cash flow by the price.

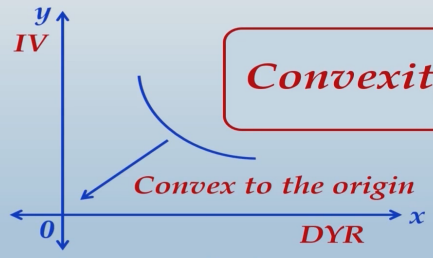
$$\text{Macaulay's Duration} = \frac{\Sigma\, n.PV}{\text{Intrinsic Value}}$$

$$\text{Modified Duration (Volatility)} = \frac{\text{Sensitivity}}{\text{Intrinsic Value}}$$

Or,

$$\text{Modified Duration (Volatility)} = \frac{\text{Macaulay's Duration}}{1 + i}$$

Measuring the Bond Convexity



$$\text{Convexity} = \frac{\Sigma\, n(n+1)PV}{V(1 + i)^2}$$

Measuring convexity is measuring the rate of change in the slope of this curve.

$$\text{Convexity} = (V_+ + V_- - 2V_0)/2V_0 \times (\text{change in YTM})^2$$