COMMERCIAL MATHEMATICS

(1) Average Due Date

(1) $d = \frac{\sum_{i=1}^{n} P_i d_i}{\sum_{i=1}^{n} P_i}$

$where,$

$d = equated\ time$

$P_i = different\ payments$

$d_i = times\ counted\ from\ the\ zero\ date$

(2) $Zero\ date + Equated\ time \rightarrow Average\ due\ date.$

(2) Discount

(1) $True\ discount,\ TD = Interest\ on\ present\ value\ of\ bill = Pni$

(2) $A = P + TD$

(3) $P = \frac{A}{1+ni}$

(4) $Discounted\ value = A(1 - ni)$

(5) $TD = Pni = \frac{Ani}{1+ni}$

(6) $BD = Interest\ on\ amount\ of\ bill = Ani$

(7) $BD = (1 + ni)TD$

(8) $Banker's\ gain,\ BG = BD - TD$

(9) $BG = Interest\ on\ TD = \frac{A(ni)^2}{1+ni}$

(10) $Amount\ of\ bill = A = \frac{BD \times TD}{BD - TD}$

(3) Annuities

(1) $Amount\ of\ an\ annuity,\ M = \frac{A}{r}[(1 + r)^n - 1]$

(2) $Present\ value\ of\ an\ annuity,\ V = \frac{A}{r}[1 - (1 + r)^{-n}]$

(3) $Amount\ of\ an\ annuity\ due,\ M = \frac{A}{r}(1 + r)[(1 + r)^n - 1]$

(4) $Present\ value\ of\ an\ annuity\ due,\ V = \frac{A}{r}(1 + r)[1 - (1 + r)^{-n}]$

(5) $Amount\ of\ deferred\ annuity,\ M = \frac{A}{r}[(1 + r)^n - 1]$

(6) $Present\ value\ of\ deferred\ annuity,\ V = \frac{A}{r(1+r)^m}[1 - (1 + r)^{-n}]$