

## APSC221 – Examination Formula Sheet

### Interest Factors:

$$(F/P, i, n) = (1 + i)^n$$

$$(P/F, i, n) = \frac{1}{(1+i)^n}$$

$$P = \lim_{n \rightarrow \infty} A \left( \frac{P}{A}, i, n \right) = \frac{A}{i}$$

To calculate effective interest rates:

$$i_e = (1 + i_s)^m - 1$$

$$i_e = \left(1 + \frac{r}{m}\right)^m - 1$$

### Cost Estimation Techniques:

$$C_n = C_k \left( \frac{I_n}{I_k} \right) \text{ Estimate year } n, \text{ based on year } k$$

$$Zu = K \left[ u^{\left( \frac{\log S}{\log 2} \right)} \right] \text{ } u = \text{output unit \#}$$

K = resources for 1<sup>st</sup> unit

S = learning curve parameter

$$C_A = C_B \left( \frac{S_A}{S_B} \right)^X \text{ } C = \text{Cost}$$

S = Size

X = cost-capacity factor

### Risk:

$$\text{Expected Value, } EV(X) = \sum_{i=1}^m x_i p(x_i)$$

$$\text{Project Risk Factor} = P_f + C_f - (P_f)(C_f)$$

### Taxes:

$$CTF = 1 - \frac{td \left(1 + \frac{i}{2}\right)}{(i + d)(1 + i)}$$

$$CSF = 1 - \frac{td}{(i + d)}$$

### Equivalent Annual Costs:

$$EAC_{\text{Total}} = EAC_{\text{Capital}} + EAC_{\text{O\&M}}$$

$$EAC_{\text{Capital}} = (P - S)(A/P, i, n) + Si$$

### Depreciation:

$$BV_{SL}(n) = P - n \left( \frac{P - S}{N} \right), D_{SL}(n) = \frac{P - S}{N}$$

$$BV_{DB}(n) = P(1 - d)^n, D_{DB}(n) = BV_{DB}(n-1) d$$

$$\text{Where; } d = 1 - \sqrt[N]{\frac{S}{P}}$$

### Inflation:

$$i_{\text{Real}} = \frac{1 + i_{\text{Actual}}}{1 + f} - 1$$

$$i_{\text{Actual}} = (1 + i_{\text{Real}})(1 + f) - 1$$

$$\text{Actual\$} = \text{Real\$} (1 + f)^n$$

### Financial Ratios:

Acid Test Ratio = Quick Assets / Current Liabilities

Current Ratio = Current Assets / Current Liabilities

Equity Ratio = Total Equity / (Total Equity + Total Liabilities)

Inventory Turnover = Sales / Inventory

Working Capital = Current Assets – Current Liabilities

Return on Assets (ROA) = Net Income / Total Assets

Return on Equity (ROE) = Net Income / Total Equity

$$\text{Return on Capital Employed (ROCE)} = \frac{\text{EBIT}(1-t)}{\text{Debt} + \text{Equity}}$$

$$\text{Debt to Capital Employed } (\lambda) = \text{Debt} / (\text{Debt} + \text{Equity})$$

Weighted average Cost of Capital:

$$WACC = \lambda(1-t)i_B + (1-\lambda)e_a$$

Capital Asset Pricing Model (CAPM)

$$e_a = R_S = R_F + \beta_S(R_M - R_F)$$

Where;

- EBIT is the earnings before interest and tax
- Debt includes all interest bearing liabilities
- $\lambda$  is the ratio of total debt (short and long-term) to total debt plus equity.
- $t$  is the effective tax rate and can be computed as  $t = \text{tax paid} / \text{earnings before tax}$
- $i_B$  is the cost of debt financing
- $e_a$  is the cost of equity financing
- $R_S$  is the return on a stock
- $R_M$  is the market return
- $R_F$  is the risk free return
- $\beta_S$  is the level of risk associated with the stock