

## Formulae Sheet

Economic order quantity

$$= \sqrt{\frac{2C_o D}{C_H}}$$

Miller – Orr Model

Return point = Lower limit +  $\left(\frac{1}{3} \times \text{spread}\right)$

$$\text{Spread} = 3 \left[ \frac{\frac{3}{4} \times \text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate}} \right]^{\frac{1}{3}}$$

The Capital Asset Pricing Model

$$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$$

The asset beta formula

$$\beta_a = \left[ \frac{V_e}{(V_e + V_d(1 - T))} \beta_e \right] + \left[ \frac{V_d(1 - T)}{(V_e + V_d(1 - T))} \beta_d \right]$$

The Growth Model

$$P_a = \frac{D_a(1 + g)}{(r_a - g)}$$

Gordon's growth approximation

$$g = br_a$$

The weighted average cost of capital

$$\text{WACC} = \left[ \frac{V_e}{V_e + V_d} \right] k_e + \left[ \frac{V_d}{V_e + V_d} \right] k_d(1 - T)$$

The Fisher formula

$$(1 + i) = (1 + r)(1 + h)$$

Purchasing power parity and interest rate parity

$$S_1 = S_0 \times \frac{(1 + h_f)}{(1 + h_h)}$$

$$F_0 = S_0 \times \frac{(1 + i_f)}{(1 + i_h)}$$

**Present Value Table**

Present value of 1 i.e.  $(1 + r)^{-n}$

Where  $r$  = discount rate  
 $n$  = number of periods until payment

|                |     | <i>Discount rate (r)</i> |       |       |       |       |       |       |       |       |       |    |
|----------------|-----|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| <i>Periods</i> |     | 1%                       | 2%    | 3%    | 4%    | 5%    | 6%    | 7%    | 8%    | 9%    | 10%   |    |
| 1              | (n) | 0.990                    | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | 1  |
| 2              |     | 0.980                    | 0.961 | 0.943 | 0.925 | 0.907 | 0.890 | 0.873 | 0.857 | 0.842 | 0.826 | 2  |
| 3              |     | 0.971                    | 0.942 | 0.915 | 0.889 | 0.864 | 0.840 | 0.816 | 0.794 | 0.772 | 0.751 | 3  |
| 4              |     | 0.961                    | 0.924 | 0.888 | 0.855 | 0.823 | 0.792 | 0.763 | 0.735 | 0.708 | 0.683 | 4  |
| 5              |     | 0.951                    | 0.906 | 0.863 | 0.822 | 0.784 | 0.747 | 0.713 | 0.681 | 0.650 | 0.621 | 5  |
| 6              |     | 0.942                    | 0.888 | 0.837 | 0.790 | 0.746 | 0.705 | 0.666 | 0.630 | 0.596 | 0.564 | 6  |
| 7              |     | 0.933                    | 0.871 | 0.813 | 0.760 | 0.711 | 0.665 | 0.623 | 0.583 | 0.547 | 0.513 | 7  |
| 8              |     | 0.923                    | 0.853 | 0.789 | 0.731 | 0.677 | 0.627 | 0.582 | 0.540 | 0.502 | 0.467 | 8  |
| 9              |     | 0.914                    | 0.837 | 0.766 | 0.703 | 0.645 | 0.592 | 0.544 | 0.500 | 0.460 | 0.424 | 9  |
| 10             |     | 0.905                    | 0.820 | 0.744 | 0.676 | 0.614 | 0.558 | 0.508 | 0.463 | 0.422 | 0.386 | 10 |
| 11             |     | 0.896                    | 0.804 | 0.722 | 0.650 | 0.585 | 0.527 | 0.475 | 0.429 | 0.388 | 0.350 | 11 |
| 12             |     | 0.887                    | 0.788 | 0.701 | 0.625 | 0.557 | 0.497 | 0.444 | 0.397 | 0.356 | 0.319 | 12 |
| 13             |     | 0.879                    | 0.773 | 0.681 | 0.601 | 0.530 | 0.469 | 0.415 | 0.368 | 0.326 | 0.290 | 13 |
| 14             |     | 0.870                    | 0.758 | 0.661 | 0.577 | 0.505 | 0.442 | 0.388 | 0.340 | 0.299 | 0.263 | 14 |
| 15             |     | 0.861                    | 0.743 | 0.642 | 0.555 | 0.481 | 0.417 | 0.362 | 0.315 | 0.275 | 0.239 | 15 |
| 11             | (n) | 0.901                    | 0.893 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 1  |
| 12             |     | 0.812                    | 0.797 | 0.783 | 0.769 | 0.756 | 0.743 | 0.731 | 0.718 | 0.706 | 0.694 | 2  |
| 13             |     | 0.731                    | 0.712 | 0.693 | 0.675 | 0.658 | 0.641 | 0.624 | 0.609 | 0.593 | 0.579 | 3  |
| 14             |     | 0.659                    | 0.636 | 0.613 | 0.592 | 0.572 | 0.552 | 0.534 | 0.516 | 0.499 | 0.482 | 4  |
| 15             |     | 0.593                    | 0.567 | 0.543 | 0.519 | 0.497 | 0.476 | 0.456 | 0.437 | 0.419 | 0.402 | 5  |
| 6              |     | 0.535                    | 0.507 | 0.480 | 0.456 | 0.432 | 0.410 | 0.390 | 0.370 | 0.352 | 0.335 | 6  |
| 7              |     | 0.482                    | 0.452 | 0.425 | 0.400 | 0.376 | 0.354 | 0.333 | 0.314 | 0.296 | 0.279 | 7  |
| 8              |     | 0.434                    | 0.404 | 0.376 | 0.351 | 0.327 | 0.305 | 0.285 | 0.266 | 0.249 | 0.233 | 8  |
| 9              |     | 0.391                    | 0.361 | 0.333 | 0.308 | 0.284 | 0.263 | 0.243 | 0.225 | 0.209 | 0.194 | 9  |
| 10             |     | 0.352                    | 0.322 | 0.295 | 0.270 | 0.247 | 0.227 | 0.208 | 0.191 | 0.176 | 0.162 | 10 |
| 11             |     | 0.317                    | 0.287 | 0.261 | 0.237 | 0.215 | 0.195 | 0.178 | 0.162 | 0.148 | 0.135 | 11 |
| 12             |     | 0.286                    | 0.257 | 0.231 | 0.208 | 0.187 | 0.168 | 0.152 | 0.137 | 0.124 | 0.112 | 12 |
| 13             |     | 0.258                    | 0.229 | 0.204 | 0.182 | 0.163 | 0.145 | 0.130 | 0.116 | 0.104 | 0.093 | 13 |
| 14             |     | 0.232                    | 0.205 | 0.181 | 0.160 | 0.141 | 0.125 | 0.111 | 0.099 | 0.088 | 0.078 | 14 |
| 15             |     | 0.209                    | 0.183 | 0.160 | 0.140 | 0.123 | 0.108 | 0.095 | 0.084 | 0.074 | 0.065 | 15 |

### Annuity Table

Present value of an annuity of 1 i.e.  $\frac{1 - (1 + r)^{-n}}{r}$

Where  $r$  = discount rate  
 $n$  = number of periods

|                |       | <i>Discount rate (r)</i> |       |       |       |       |       |       |       |       |     |    |
|----------------|-------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----|----|
| <i>Periods</i> |       | 1%                       | 2%    | 3%    | 4%    | 5%    | 6%    | 7%    | 8%    | 9%    | 10% |    |
| (n)            |       |                          |       |       |       |       |       |       |       |       |     |    |
| 1              | 0.990 | 0.980                    | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 |     | 1  |
| 2              | 1.970 | 1.942                    | 1.913 | 1.886 | 1.859 | 1.833 | 1.808 | 1.783 | 1.759 | 1.736 |     | 2  |
| 3              | 2.941 | 2.884                    | 2.829 | 2.775 | 2.723 | 2.673 | 2.624 | 2.577 | 2.531 | 2.487 |     | 3  |
| 4              | 3.902 | 3.808                    | 3.717 | 3.630 | 3.546 | 3.465 | 3.387 | 3.312 | 3.240 | 3.170 |     | 4  |
| 5              | 4.853 | 4.713                    | 4.580 | 4.452 | 4.329 | 4.212 | 4.100 | 3.993 | 3.890 | 3.791 |     | 5  |
| 6              | 5.795 | 5.601                    | 5.417 | 5.242 | 5.076 | 4.917 | 4.767 | 4.623 | 4.486 | 4.355 |     | 6  |
| 7              | 6.728 | 6.472                    | 6.230 | 6.002 | 5.786 | 5.582 | 5.389 | 5.206 | 5.033 | 4.868 |     | 7  |
| 8              | 7.652 | 7.325                    | 7.020 | 6.733 | 6.463 | 6.210 | 5.971 | 5.747 | 5.535 | 5.335 |     | 8  |
| 9              | 8.566 | 8.162                    | 7.786 | 7.435 | 7.108 | 6.802 | 6.515 | 6.247 | 5.995 | 5.759 |     | 9  |
| 10             | 9.471 | 8.983                    | 8.530 | 8.111 | 7.722 | 7.360 | 7.024 | 6.710 | 6.418 | 6.145 |     | 10 |
| 11             | 10.37 | 9.787                    | 9.253 | 8.760 | 8.306 | 7.887 | 7.499 | 7.139 | 6.805 | 6.495 |     | 11 |
| 12             | 11.26 | 10.58                    | 9.954 | 9.385 | 8.863 | 8.384 | 7.943 | 7.536 | 7.161 | 6.814 |     | 12 |
| 13             | 12.13 | 11.35                    | 10.63 | 9.986 | 9.394 | 8.853 | 8.358 | 7.904 | 7.487 | 7.103 |     | 13 |
| 14             | 13.00 | 12.11                    | 11.30 | 10.56 | 9.899 | 9.295 | 8.745 | 8.244 | 7.786 | 7.367 |     | 14 |
| 15             | 13.87 | 12.85                    | 11.94 | 11.12 | 10.38 | 9.712 | 9.108 | 8.559 | 8.061 | 7.606 |     | 15 |
| (n)            | 11%   | 12%                      | 13%   | 14%   | 15%   | 16%   | 17%   | 18%   | 19%   | 20%   |     |    |
| 1              | 0.901 | 0.893                    | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 |     | 1  |
| 2              | 1.713 | 1.690                    | 1.668 | 1.647 | 1.626 | 1.605 | 1.585 | 1.566 | 1.547 | 1.528 |     | 2  |
| 3              | 2.444 | 2.402                    | 2.361 | 2.322 | 2.283 | 2.246 | 2.210 | 2.174 | 2.140 | 2.106 |     | 3  |
| 4              | 3.102 | 3.037                    | 2.974 | 2.914 | 2.855 | 2.798 | 2.743 | 2.690 | 2.639 | 2.589 |     | 4  |
| 5              | 3.696 | 3.605                    | 3.517 | 3.433 | 3.352 | 3.274 | 3.199 | 3.127 | 3.058 | 2.991 |     | 5  |
| 6              | 4.231 | 4.111                    | 3.998 | 3.889 | 3.784 | 3.685 | 3.589 | 3.498 | 3.410 | 3.326 |     | 6  |
| 7              | 4.712 | 4.564                    | 4.423 | 4.288 | 4.160 | 4.039 | 3.922 | 3.812 | 3.706 | 3.605 |     | 7  |
| 8              | 5.146 | 4.968                    | 4.799 | 4.639 | 4.487 | 4.344 | 4.207 | 4.078 | 3.954 | 3.837 |     | 8  |
| 9              | 5.537 | 5.328                    | 5.132 | 4.946 | 4.772 | 4.607 | 4.451 | 4.303 | 4.163 | 4.031 |     | 9  |
| 10             | 5.889 | 5.650                    | 5.426 | 5.216 | 5.019 | 4.833 | 4.659 | 4.494 | 4.339 | 4.192 |     | 10 |
| 11             | 6.207 | 5.938                    | 5.687 | 5.453 | 5.234 | 5.029 | 4.836 | 4.656 | 4.486 | 4.327 |     | 11 |
| 12             | 6.492 | 6.194                    | 5.918 | 5.660 | 5.421 | 5.197 | 4.988 | 4.793 | 4.611 | 4.439 |     | 12 |
| 13             | 6.750 | 6.424                    | 6.122 | 5.842 | 5.583 | 5.342 | 5.118 | 4.910 | 4.715 | 4.533 |     | 13 |
| 14             | 6.982 | 6.628                    | 6.302 | 6.002 | 5.724 | 5.468 | 5.229 | 5.008 | 4.802 | 4.611 |     | 14 |
| 15             | 7.191 | 6.811                    | 6.462 | 6.142 | 5.847 | 5.575 | 5.324 | 5.092 | 4.876 | 4.675 |     | 15 |

**End of Question Paper**