

| | | | | | |
|-----------|------------------|---------------|--------------|--------------|--------------|
| Bond ID | 1 | 2 | 3 | 4 | 5 |
| Coupon(%) | 3.25 | 2.75 | 2.5 | 3.25 | 6.75 |
| Maturity | February 1, 2025 | March 1, 2027 | June 1, 2030 | June 1, 2033 | June 1, 2037 |
| Price | 100.701 | 96.566 | 91.165 | 93.238 | 129.869 |
| Par | 100 | 100 | 100 | 100 | 100 |
| coupn /yr | 2 | 2 | 2 | 2 | 2 |
| quoted on | 2022-02-17 | | | | |

a)

| | | | | | |
|-----------------|-------------|------------|-------------|-------------|-------------|
| | Bond 1 | Bond 2 | Bond 3 | Bond 4 | Bond 5 |
| current date | 2022-02-17 | 2022-02-17 | 2022-02-17 | 2022-02-17 | 2022-02-17 |
| Maturity | 2025-02-01 | 2027-03-01 | 2030-06-01 | 2033-06-01 | 2037-06-01 |
| coupon rate | 3.25% | 2.75% | 2.50% | 3.25% | 6.75% |
| Quoted price | 100.701 | 96.566 | 91.165 | 93.238 | 129.869 |
| Accrued intrest | \$ 0.0884 | \$ 0.9337 | \$ 0.4286 | \$ 0.4286 | \$ 0.4286 |
| Full price | \$ 100.84 | \$ 97.85 | \$ 91.70 | \$ 93.93 | \$ 131.32 |
| Yield | 0.030000491 | 0.03499909 | 0.037499984 | 0.039999799 | 0.041000215 |

b) last year answer

| | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|
| Bond ID | 1 | 2 | 3 | 4 | 5 |
| a(fraction) | 0.08839779 | 0.933701657 | 0.428571429 | 0.428571429 | 0.428571429 |
| r/2 | 0.015000246 | 0.017499545 | 0.018749992 | 0.0199999 | 0.020500108 |
| c/2 | 0.01625 | 0.01375 | 0.0125 | 0.01625 | 0.03375 |
| N | 6 | 11 | 17 | 23 | 31 |
| MacDur0 | 5.766196882 | 10.26651372 | 15.32414494 | 19.21235159 | 21.19017969 |
| MacDur | 2.838899546 | 4.66640603 | 7.447786756 | 9.391890082 | 10.38080413 |
| ModDur | 2.79694469 | 4.58615048 | 7.31071098 | 9.20773628 | 10.17227147 |

| | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|
| r | 0.009995192 | 0.009373975 | 0.009395489 | 0.009971253 | 0.011087049 |
| c | 0.01125 | 0.00875 | 0.0075 | 0.01125 | 0.02875 |
| N | 6 | 11 | 17 | 23 | 31 |

| | | | | | |
|--------------------------------------|--------------|--------------|-------------|-------------|-------------|
| =B28/B27^3 | 4814.578327 | 2565.797696 | 1896.298738 | 2031.280546 | 3917.466999 |
| =((B29+1)*(B29+2))/((1+B27)^B29) | 51.21428843 | 128.8985811 | 249.3885985 | 380.4944108 | 562.9362506 |
| =((2*B29)*(B29+2))/((1+B27)^(B29+1)) | 86.4984254 | 232.2497995 | 462.3974052 | 714.9813977 | 1068.778903 |
| =(1-B42) | -4813.578327 | -2564.797696 | -1895.29874 | -2030.28055 | -3916.467 |
| =(B29*(B29+1))/((1+B27)^(B29+2)) | 37.28379503 | 105.3486615 | 214.9991181 | 336.4618673 | 507.7861607 |
| top | 38.93008599 | 111.909154 | 233.3714987 | 387.4869212 | 729.0900722 |

| | | | | | |
|----------------------------------|-------------|-------------|-------------|-------------|-------------|
| =B28 | 0.01625 | 0.01375 | 0.0125 | 0.01625 | 0.03375 |
| =(1/B27)-(1/(B27*(1+B27)^(B29))) | 5.697182401 | 9.927517661 | 14.44233001 | 18.29222413 | 22.77629149 |
| =1/(1+B27)^B29 | 0.914540865 | 0.826272956 | 0.729206428 | 0.634157351 | 0.533083571 |
| bottom | 1.007120079 | 0.962776324 | 0.909735554 | 0.931405993 | 1.301783408 |
| Conv0 | 38.65486034 | 116.2358809 | 256.5267431 | 416.0236502 | 560.0701834 |

a)

| | | | | | |
|-----------------|------------|-------------|------------|------------|------------|
| | Bond 1 | Bond 2 | Bond 3 | Bond 4 | Bond 5 |
| current date | 2022-02-17 | 2022-02-17 | 2022-02-17 | 2022-02-17 | 2022-02-17 |
| Maturity | 2025-02-01 | 2027-03-01 | 2030-06-01 | 2033-06-01 | 2037-06-01 |
| coupon rate | 0.0325 | 0.0275 | 0.025 | 0.0325 | 0.0675 |
| Quoted price | 100.701 | 96.566 | 91.165 | 93.238 | 129.869 |
| Accrued intrest | 0.08839779 | 0.933701657 | 0.42857143 | 0.42857143 | 0.42857143 |
| Full price | 100.844646 | 97.84983978 | 91.7007143 | 93.9344286 | 131.315429 |
| Yield | 0.03000049 | 0.03499909 | 0.03749998 | 0.0399998 | 0.04100023 |

B)

| | | | | | |
|---------|------------|-------------|------------|------------|------------|
| Bond ID | 1 | 2 | 3 | 4 | 5 |
| N | 6 | 11 | 17 | 23 | 31 |
| MacDur0 | 5.76619688 | 10.26651372 | 15.3241449 | 19.2123516 | 21.1901797 |
| MacDur | 2.83889955 | 4.66640603 | 7.44778676 | 9.39189008 | 10.3808041 |
| ModDur | 2.79694469 | 4.586150483 | 7.31071098 | 9.20773628 | 10.1722715 |
| Conv0 | 38.6548603 | 116.2358809 | 256.526743 | 416.02365 | 560.070183 |

| | | | | | |
|-----------------|-------------|-------------|-------------|-------------|-------------|
| Conv | 37.58711183 | 97.6581491 | 243.6348421 | 399.9599909 | 542.3944129 |
| annualized Conv | 9.396777957 | 24.41453727 | 60.90871054 | 99.98999772 | 135.5986032 |

c)
invest
MacDur
Conv

| | |
|----|------------|
| \$ | 200,000.00 |
| | 7.5 |
| | 65 |

| | | | | |
|---------------|--------------|---------------|--------------|---------------|
| | w2 | w3 | w4 | |
| MacDur | 4.66640603 | 7.447786756 | 9.391890082 | 7.5 |
| Conv | 24.41453727 | 60.90871054 | 99.98999772 | 65 |
| weight | 1 | 1 | 1 | 1 |
| | | | | |
| weight solved | 0.156638263 | 0.592405995 | 0.250955741 | 1 |
| # of bond | 320.160 | 1292.042 | 534.321 | |
| | \$ 31,327.65 | \$ 118,481.20 | \$ 50,191.15 | \$ 200,000.00 |

d)
basis point

| | | | | |
|----------------|-------------|-------------|-------------|--|
| | 0.25% | | | |
| | w2 | w3 | w4 | |
| impact | -0.01138908 | -0.01808644 | -0.02270687 | |
| new yield | 3.75% | 4.00% | 4.25% | |
| | 1.02 | 1.01 | 1.01 | |
| pmt | 1.375 | 1.25 | 1.625 | |
| pvifa | 9.856827482 | 14.29187284 | 18.04511977 | |
| pvify | 0.815188967 | 0.714162658 | 0.616543014 | |
| new full price | \$ 96.74 | \$ 90.04 | \$ 91.80 | |

| | | | |
|------------------|---------------|--------------|--------------|
| Bond | 2 | 3 | 4 |
| mat.Date | March 1, 2027 | June 1, 2030 | June 1, 2033 |
| Full price | \$ 97.85 | \$ 91.70 | \$ 93.93 |
| yield | 0.03499909 | 0.037499984 | 0.039999799 |
| new yield | 3.75% | 4.00% | 4.25% |
| new full price | \$ 96.74 | \$ 90.04 | \$ 91.80 |
| %change | -1.139% | -1.809% | -2.271% |
| estimated change | | | |

Accurate portfolio change -0.018198552

| | | | | | |
|-----------------|------------|-------------|------------|------------|------------|
| Conv | 37.5871118 | 97.6581491 | 243.634842 | 399.959991 | 542.394413 |
| annualized Conv | 9.39677796 | 24.41453727 | 60.9087105 | 99.9899977 | 135.598603 |

c)

| | | | |
|--------------------|--------------|---------------|--------------|
| Bond ID | 2 | 3 | 4 |
| weight solved | 0.15663826 | 0.592405995 | 0.25095574 |
| # of bond | 160.080245 | 646.0211352 | 267.160555 |
| Face value of bond | \$ 31,327.65 | \$ 118,481.20 | \$ 50,191.15 |

d)

| | | | |
|---------------------------|-------------|-------------|-------------|
| Bond ID | 2 | 3 | 4 |
| impact | -0.01138908 | -0.01808644 | -0.02270687 |
| new yield | 0.03749909 | 0.039999984 | 0.0424998 |
| new full price | 96.7353837 | 90.04204548 | 91.8011881 |
| %change | -0.01138945 | -0.01808785 | -0.02270989 |
| Accurate portfolio change | | | -0.01819855 |