MIDTERM EXAM SOLUTIONS

Problem 1

a) $V_U = 360{,}000 \times \$50 = \$18\,million$

$$V_L = V_U + t_C D$$
$$= \$18M + 0.40\,(\$12M)$$
$$= \$18M + \$4.80M$$
$$= \$22.8M$$

$$E_L = V_L - D$$
$$= \$22.8M - \$12M$$
$$= \$10.8M$$

b) The number of share retired is found by

$$\frac{\$12M}{\$50} = 240{,}000\ shares$$

Therefore, the remaining (non-retired) shares is found by

$$360{,}000 - 240{,}000 = 120{,}000\ shares$$

Thus, the share price is given by

$$\frac{E_L}{120{,}000}$$

$$= \frac{\$10.8M}{120{,}000}$$

$$= \$90$$

c) $ROE^L = \frac{(1-t_C)(EBIT-I)}{E_L}$

$$= \frac{(1-0.40)(\$3{,}000{,}000 - \$480{,}000)}{\$10{,}800{,}000}$$

$$= 14\%$$

d) $ROE^U = \frac{(1-0.40)(\$3{,}000{,}000)}{\$18M}$

$$= \frac{\$1.8M}{\$18M}$$

$$= 10\%$$

Thus, the financial risk premium is found by

$$14\% - 10\% = 4\%$$

e) $WACC = \frac{(1-t_c)EBIT}{V_L}$

$$= \frac{(1-0.40)\$3M}{\$22.8M}$$

$$= 7.895\%$$

Problem 2

a) $V_L = \$18M + \left[1 - \frac{(1-0.30)(1-0.40)}{(1-0.40)}\right] D$

$= \$18M + [1-(1-0.30)]\$12M$

$= \$18M + \$3.6M$

$= \$21.6M$

Therefore,

$E_L = V_L - D$

$= \$21.6M - \$12M$

$= \$9.6M$

b) $Share\ Price = \frac{\$9.6M}{Remaining\ Shares}$

$$= \frac{\$9.6M}{120{,}000}$$

$$= \$80$$

c) The difference in the values of tax shields

$= \$4.8M - \$3.6M$

$= \$1.2M$

Problem 3

a) The share price before repurchase $= \$100$

The # of shares repurchased $= \frac{\$200{,}000}{\$100} = 2{,}000$

The # of remaining shares $= 10{,}000 - 2{,}000 = 8{,}000$

The firm value remaining after the repurchase $= \$800{,}000$

The Share Price after the repurchase $= \frac{\$800{,}000}{\$8{,}000} = \$100$

Thus, the share price remains the same at $100.

The wealth before repurchase $= 600 \times \$100 = \$60{,}000$

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Thus the wealth does not change.

b) The dividend per share under the dividend policy would have been

$$= \frac{\$200{,}000}{10{,}000} = \$20$$

Dividend on 600 shares = $600 \times \$20 = \$12{,}000$.

Thus, the home-made dividend of $12,000 can be created by selling

$$\frac{\$12{,}000}{\$100} = 120\ shares$$

c) Tax payable under dividend payment

$$= \$12{,}000 \times 30\% = \$3{,}600$$

Tax payable with sale of 120 shares to create home-made dividend

$$= (\$100 - \$40)120 \times 20\% = \$1{,}440$$

Therefore, the difference in tax payable is

$$= \$3{,}600 - \$1{,}440 = \$2{,}160$$

Problem 4

a) The value of the firm

$$= \frac{\$4{,}400}{1.10} + \frac{\$9{,}680}{(1.10)^2}$$

$$= \$4{,}000 + \$8{,}000$$

$$= \$12{,}000$$

The share price = $\frac{\$12{,}000}{2{,}000} = \$6$

Therefore, the value of the 400 shares is given by

$$400 \times \$6 = \$2{,}400$$

b) The value of the firm

$$= \frac{\$4{,}400 + \$1{,}804}{1.10} + \frac{\$9{,}680 - \$1{,}804(1.10)}{(1.10)^2}$$

$$= \frac{\$6{,}204}{1.10} + \frac{\$7{,}695.60}{(1.10)^2}$$

$$= \$5{,}640 + \$6{,}360$$

$$= \$12{,}000$$

Therefore, the share price

$$= \frac{\$12{,}000}{2{,}000} = \$6$$

Thus, the share price remains the same at $6. So the value of your 400 shares will remain the same at

$$400 \times \$6 = \$2{,}400$$

c) The value of the firm's 2,000 shares at the year-end is given by

$$\frac{\$9{,}680}{1.10} = \$8{,}800$$

Thus, the share price at the year-end is

$$\frac{\$8,800}{2,000} = \$4.40$$

Therefore, the number of shares issues for the new stock worth $1,804

$$= \frac{\$1,804}{\$4.40} = 410\ shares$$