

**ADM 3350 (Summer)**

**Solutions of Midterm Exam**

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## Problem 1

(a)  $V_U = 300,000 \times \$60 = \$18 \text{ m}$

$$V_L = V_U + t_c D = \$18 \text{ m} + (0.40) \$9 \text{ m} = \$21.6 \text{ m}$$

Thus:  $E_L = V_L - D = \$21.6 \text{ m} - \$9 \text{ m} = \boxed{\$12.6 \text{ m}}$

(b) With \$9m debt proceeds the firm will retire  
 $\$9 \text{ m} / \$60 = 150,000$  shares. The shares  
that remain =  $300,000 - 150,000 = 150,000$  shares  
Thus the share price will become =  $\frac{E_L}{150,000} = \frac{12.6 \text{ m}}{150,000}$   
=  $\boxed{\$84}$

(c) Cost of Equity:  $ROE = \frac{L}{E_L} = \frac{(1-t_c)(EBIT-I)}{E_L}$  where  
 $I = 5\% \text{ of } \$9 \text{ m debt} = \$450,000$   
Thus:  $ROE = \frac{(1-0.40)(\$3 \text{ m} - \$450,000)}{\$12.6 \text{ m}}$   
=  $\boxed{12.14\%}$

(d)  $WACC = \frac{(1-t_c)EBIT}{V_L} = \frac{(1-0.40)(\$3 \text{ m})}{\$21.6 \text{ m}} = \boxed{8.33\%}$

## Problem 2

We are given  $t_s = 20\%$ ,  $t_b = 40\%$  and  $t_c = 40\%$

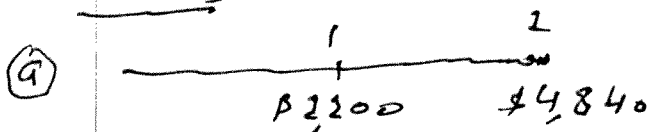
(a)  $V_L = V_U + \left[ 1 - \frac{(1-t_s)(1-t_c)}{(1-t_b)} \right] D = 18 \text{ m} + \left[ 1 - \frac{(1-0.20)(1-0.40)}{(1-0.40)} \right] \$9 \text{ m}$   
=  $\$18 \text{ m} + \$1.8 \text{ m} = \cancel{\$19.8 \text{ m}} \$19.8 \text{ m}$

Thus:  $E_L = V_L - D = \$19.8 \text{ m} - \$9 \text{ m} = \boxed{\$10.8 \text{ m}}$

(b) From Problem 1 above, the shares that remain after \$9m  
debt proceeds are used to retire 150,000 shares = 150,000 shares  
Thus the share price will become =  $\frac{\$10.8 \text{ m}}{150,000} = \boxed{\$72}$

### Problem 3

(2)

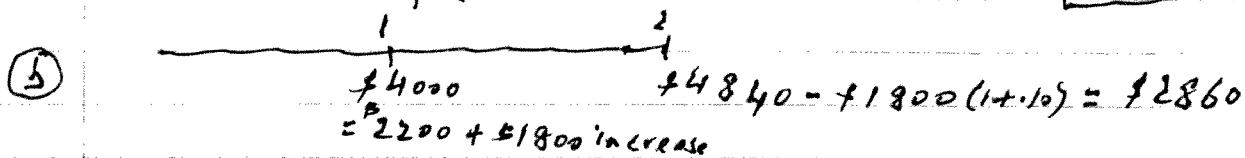


$$\text{Value of the firm} = \frac{\$2,200}{(1+.10)} + \frac{\$4,840}{(1+.10)}$$

$$= \$2,000 + \$4,000 = \$6,000$$

$$\text{Share Price} = \frac{\$6,000}{1,000} = \$6$$

Therefore: Value of your 100 shares =  $100 \times \$6 = \boxed{\$600}$



Value of 100 existing shares is the PV of dividend payout

$$= \frac{4,000}{1+.10} + \frac{2,860}{(1+.10)^2}$$

$$= \$6,000$$

~~Share price = \$6~~

Thus value of your 100 share which are  $\frac{100}{1,000} = \frac{1}{10}$  of existing shares

$$= \left(\frac{1}{10}\right) (\$6,000) = \boxed{\$600}$$

Thus Issuing of \$1,800 worth of New stock will NOT change the value of your shares.

### Problem 4

(a) Your wealth (value of your shares) BEFORE dividend ~~pay~~ <sup>payout</sup>

$$= 600 \times \$50 = \$30,000$$

Share price after dividend payout =  $\frac{\$500,000 - \$100,000}{10,000}$

with \$100,000 excess cash

$$= \$40$$

Therefore, your wealth (value of your shares) =  $600 \times \$40 + \text{Dividend on your shares}$

$$= \$24,000 + (\text{Dividend per share}) 600$$

$$= \$24,000 + \left(\frac{\$100,000}{10,000}\right) 600 = \$24,000 + (\$10) 600$$

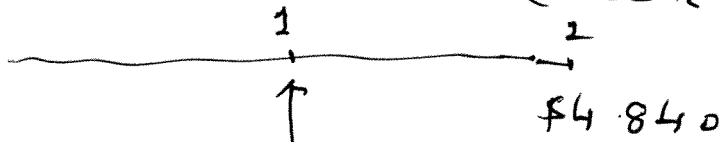
$$= \$24,000 + 6,000 = \$30,000$$

Thus your wealth before, and after the dividend payout under Alternative 1 remains the same (equal to \$30,000).

- b) Your wealth (value of our shares) **BEFORE** share repurchase (Under Alternative 2) =  $600 \times \$50 = \$30,000$ . To conduct the repurchase with the excess cash, the firm will repurchase (retire)  $\$100,000 / \$50 = 2,000$  shares. The shares that remain =  $10,000 - 2,000 = 8,000$ . Price per share after the repurchase =  $\frac{\$500,000 - \$100,000}{8,000} = \$50$  (i.e. the price per share will not change; will remain at \$50). Thus: your wealth =  $600 \times \$50 = \$30,000$ . Therefore under Alternative 2 of repurchase your wealth will remain the same.
- c) If the company under Alternative 2 repurchases shares at \$50 per share, you can create \$6,000 of "home-made dividend" by selling  $\frac{\$6,000}{\$50} = \mathbf{120}$  shares.
- d) Under Alternative 1 of dividend payout, you would have obtained \$6,000 dividend on your shares and would have paid tax = 30% of \$6,000 = \$1,800. With creation of home-made dividend you will sell 120 shares (as in part c) at \$50 per share which you had purchased at \$20 per share. Thus you will make capital gain of  $120 (\$50 - \$20) = \$3,600$  on which you will pay capital gain tax of  $(\$3,600)(1/2) 40\% = \$3,600 \times 20\% = \$720$ . Thus you will pay  $\$1,800 - \$720 = \mathbf{\$1,080}$  less tax if the company chooses the repurchase under Alternative 2 instead of Alternative 1 of dividend payout.

# Answer to Bonus Question

Before the new stock issue:



$$V_1 = \frac{\$4840}{1.10} = \$4400$$

Therefore, the ~~stock~~ existing 1000 shares will be priced at  $\frac{\$4400}{1000} = \$4.4$  per share

The # of new stock shares to be issued at year-end 1 =  $\frac{\$1800}{\$4.4} = \frac{1800}{4.4}$

The total # of shares (existing and new) at ~~year-end 1~~ year-end 1 =  $1000 + \frac{1800}{4.4} = \frac{6200}{4.4}$  shares

The \$1800 raised with the new stock issue, if invested at year-end 1 will generate additional ~~cash~~ cashflow of  $\$1800(1.10) = \$1980$  at year-end 2.

Therefore the total dividend to all  $\frac{6200}{4.4}$  shares at year-end 1 will equal:  $\$4840 + \$1980 = \$6820$ .

Thus the Dividend per share ~~at~~ at year-end 1 (DPS<sub>1</sub>) =  $\frac{\$6820}{\frac{6200}{4.4}} = \boxed{\$4.84}$

The question asked is answered in full above ~~So~~ So, what follows is just a comment, on the next page.

# Comment

$$\text{Proportionate ownership of existing shareholders at year-end 1} = \frac{1000}{\left(\frac{6200}{4.4}\right)} = \frac{4400}{6200}$$

$$\text{Proportionate ownership of new shareholders at year-end 1} = \frac{\left(\frac{1800}{4.4}\right)}{\left(\frac{6200}{4.4}\right)} = \frac{1800}{6200}$$

$$\text{Dividend payout to all 1000 existing shares at yr. end 1} \\ = \frac{4400}{6200} (\$6820) = \$4840$$

$$\text{Therefore per share dividend at year-end 2 to each of 1000 existing shares} = \frac{\$4840}{1000} = \$4.84$$

$$\text{Dividend payout to new shares at year-end 2} \\ = \left(\frac{1800}{6200}\right) (\$6820) = \$1980$$

$$\text{Therefore, per share dividend at year-end 2 to each of } \frac{1800}{4.4} \text{ new shares} \\ = \$1980 \div \frac{1800}{4.4} = \$4.84$$

So, the answer given earlier is confirmed again.