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- Preferred stock: concepts and calculations
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Sample Questions

1. If a stock’s dividend is expected to grow at a constant rate of 5% a year, which of the following statements is correct? (c)
   a. The expected return on the stock is 5% a year.
   b. The stock’s dividend yield is 5%.
   c. The stock’s price one year from now is expected to be 5% higher.
   d. The stock’s required return must be equal to or less than 5%.
   e. The price of the stock is expected to decline in the future.

   (Under the constant growth model, if dividend grows at g% per year, stock price will also increase by g% per year)

   For the next four questions, suppose the following holds:
   AGI is expected to pay $1.20 cash dividend next year. The dividend growth rate is 6% and constant. The current stock price of AGI is $24.

2. What is the expected rate of return to invest in AGI? (c)
   a. 8.0%  b. 10.0%  c. 11.0%  d. 12.0%  e. 13.0%
   (Expected return = (1.2 / 24) + 0.06 = 0.11 = 11.0%)

3. What should be the stock price in 3 years, if all things keep the same? (a)
   a. $28.58  b. $29.60  c. $30.32  d. $31.45  e. $32.23
   (Under the constant growth model, if dividend grows at g% per year, stock price will also increase by g% per year. So P₃ = (P₀)*(1 + g)³ = 24*(1 + 0.06)³ = $28.58)

4. If the required rate of return for the stock is 12%, what should be the fair value of the stock? (d)
   a. $26.00  b. $24.00  c. $22.00  d. $20.00  e. None of the above
   (Fair value = 1.2 / (0.12 - 0.06) = $20.00)
5. Should you buy the stock? (e)
   a. No, it is overvalued because the fair value is smaller than the market price
   b. No, it is overvalued because RRR is greater than the expected rate of return
   c. Yes, it is undervalued because the fair value is greater than the market price
   d. Yes, it is undervalued because RRR is smaller than the expected rate of return
   e. Both a and b are correct
   (Stock is over-valued since fair value < market price or expected return < required return)

6. Which of the following is not a capital component when calculating the weighted average cost of capital (WACC)? (d)
   a. Long-term debt
   b. Common stock
   c. Retained earnings
   d. Accounts payable
   e. Preferred stock
   (Capital components include debt, stock, retained earnings, and preferred stock)

For the next seven questions, suppose the following holds:
Rollins Corporation is constructing its MCC schedule. Its target capital structure is 20% debt, 20% preferred stock, and 60% common equity. Its bonds carry a 12% coupon rate (paid semiannually), have a current maturity of 20 years and a net price of $960. The firm could sell, at par, $100 preferred stock that pays a $10 annual dividend, but flotation costs of 5% would be incurred. Rollins’ beta is 1.5, the risk-free rate is 4%, and the market return is 12%. Rollins is a constant growth firm which just paid a dividend of $2.00, sells for $27.00 per share, and has a growth rate of 8%. Flotation cost on new common stock is 6%, and the firm’s marginal tax rate is 40%.

7. What is Rollins cost of debt before and after tax? (a)
   a. 12.55% and 7.54%
   b. 14.33% and 8.60%
   c. 13.34% and 8.00%
   d. 11.34% and 6.80%
   e. None of the above
   (PV = 960, PMT = -60, FV = -1,000, N = 40, solve for I/YR = 6.275%, cost of debt before tax rd = 2*6.275% = 12.55%, after tax rd*(1 - T) = 7.54%)

8. What is Rollins’ cost of preferred stock? (c)
   a. 8.98%
   b. 9.38%
   c. 10.53%
   d. 11.21%
   e. 12.34%
   (10 / (100 - 5) = 10.53%)
9. What is Rollins’ cost of retained earnings using the CAPM approach? (e)
   a. 12%   b. 13%   c. 14%   d. 15%   e. 16%
   \(4\% + (12\% - 4\%)*1.5 = 16\%\)

10. What is the firm’s cost of retained earnings using the DCF approach? (a)
    a. 16%   b. 15%   c. 14%   d. 13%   e. 12%
    \([2.00*(1 + 0.08) / 27] + 0.08 = 0.16 = 16\%\)

11. What is Rollins WACC if it uses debt, preferred stock, and R/E to finance? (d)
    a. 12.21%   b. 12.56%   c. 13.02%   d. 13.21%   e. None of the above
    \(WACC = (0.2)*(7.54) + (0.2)*(10.53) + (0.6)*(16) = 13.21\%\)

12. What is the cost of new common stock financing? (d)
    a. 13.23%   b. 14.56%   c. 15.56%   d. 16.51%   e. 17.23%
    \(\text{Cost of new common stock} = \left[\frac{2.00(1 + 0.08)}{27(1 - 0.06)}\right] + 0.08 = 0.1651 = 16.51\%\)

13. What is Rollins’ WACC once it starts using debt, preferred stock, and new common stock to finance? (b)
    a. 13.20%   b. 13.52%   c. 13.86   d. 14.23%   e. None of the above
    \(WACC = (0.2)*(7.54) + (0.2)*(10.53) + (0.6)*(16.51) = 13.52\%\)

14. Given the following cash flows, what is the discounted payback period for Project S if the cost of capital is 8%? (c)
    After-tax cash flows
    \[
    \begin{array}{cc}
    \text{Year} & \text{Project S} \\
    0 & -100,000 \\
    1 & 60,000 \\
    2 & 60,000 \\
    \end{array}
    \]
    a. 1.65 years   b. 1.76 years   c. 1.86 years   d. 1.95 years   e. 2.00 years
    \(\text{First find PV for CF}_1 \text{ and } \text{CF}_2, \text{ enter } FV = 60,000, \ N = 1, \ PMT = 0, \ I/YR = 8\%, \text{ solve for } PV = 55,556, \text{ then enter } FV = 60,000, \ N = 2, \ PMT = 0, \ I/YR = 8\%, \text{ solve for } PV = 51,440; \text{ DPB} = 1 + 44,444 / 51,440 = 1.86 \text{ years}\)
15. Assume a project has normal cash flows. All else equal, which of the following statements is correct? (b)

a. The project’s IRR increases as the WACC declines.
b. The project’s NPV increases as the WACC declines.
c. The project’s MIRR is unaffected by changes in the WACC.
d. The project’s regular payback increases as the WACC declines.
e. The project’s discounted payback increases as the WACC declines.
(Since WACC is used as the discount rate to calculate NPV, the lower the WACC, the higher the NPV)

For the next five questions, suppose the following holds:
The net cash flows for projects X and Y are as follows:

<table>
<thead>
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<th>Year</th>
<th>Project X</th>
<th>Project Y</th>
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<tr>
<td>0</td>
<td>-$10,000</td>
<td>-$100,000.00</td>
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<tr>
<td>1</td>
<td>6,500</td>
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</tr>
<tr>
<td>2</td>
<td>3,000</td>
<td>35,026.27</td>
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<tr>
<td>3</td>
<td>3,000</td>
<td>35,026.27</td>
</tr>
<tr>
<td>4</td>
<td>1,000</td>
<td>35,026.27</td>
</tr>
</tbody>
</table>

The company uses a 12% cost of capital. NPV_X = $966.01 and IRR_X = 18.03%.

16. What is the PB period for project X? (b)

a. 1.95 years  b. 2.17 years  c. 2.25 years  d. 2.50 years  e. 3.00 years
(2 + 500 / 3,000 = 2.17)

17. What is the NPV of project Y? (b)

a. $5,385.29  
b. $6,387.02  
c. $7,385.29  
d. $8,385.29  
e. $9,385.29  
(CF_0 = -100,000, CF_1 = 35,026.27, F01 = 4 (or you can enter one by one), I = 12%, solve for NPV = 6,387.02)

18. What is the IRR of project Y? (d)

a. 10%  
b. 12%  
c. 14%  
d. 15%  
e. 18%  
(CF_0 = -100,000, CF_1 = 35,026.27, F01 = 4 (or you can enter one by one), solve for IRR = 15%)
19. Which project should be accepted if they are mutually exclusive? (b)
   a. Project X
   b. Project Y
   c. Both of them
   d. None of them
   e. It cannot be determined
   (There is a ranking problem because NPV_Y > NPV_X but IRR_Y < IRR_X. Since Y and X are mutually exclusive, your decision should be based on NPV)

20. Which project(s) should be accepted if they are independent? (c)
   a. Project X
   b. Project Y
   c. Both of them
   d. None of them
   e. It cannot be determined
   (Since both projects have NPV > 0 and therefore both are good projects)

For the next five questions, suppose the following holds:
The president of Real Time, Inc. has asked you to evaluate the proposed acquisition of a new computer. The computer’s price is $40,000 and there will be another $2,000 for shipping and installation. The computer falls into MACRS 3-year class (Use 33%, 45%, 15%, 7% depreciation schedule). Purchase of the computer would require an increase in net working capital of $2,000. The computer would increase the firm’s before-tax revenues by $20,000 per year but would also increase operating costs by $5,000 per year. The computer is expected to be used for 3 years and then be sold for $15,000. The firm’s marginal tax rate is 40%, and the project’s cost of capital is 14%.

21. What is the net initial outlay (at time t = 0)? (c)
   a. $40,000  b. $42,000  c. $44,000  d. $46,000  e. None of the above
   (Initial outlay = 40,000 + 2,000 + 2,000 = 44,000, where 42,000 is the depreciation basis and 2,000 is the increase in net working capital)

22. What is the expected operating cash flow in year 1? (d)
   a. $19,845  b. $16,535  c. $15,238  d. $14,544  e. $13,538
   (20,000 - 5,000)*(1 - 0.4) + 42,000*(0.33)*(0.4) = 14,544 (the first term is the net increase in revenue after tax and the second term is the depreciation tax savings)
23. What are the expected operating cash flows in year 2 and 3?  
(a)  
   a. $16,560; $11,520  
   b. $16,500; $12,350  
   c. $15,600; $11,520  
   d. $12,350; $14,250  
   e. $13,650; $13,890  
(Similar to the procedure above, but you need to change the depreciation rates. In year 2, the rate is 45%; and in year 3, the rate is 15%)  

24. What is the expected terminal cash flow in year 3, excluding the operating cash flow?  
(b)  
   a. $13,456  
   b. $12,176  
   c. $11,234  
   d. $10,246  
   e. None of the above  
(15,000 - [(15,000 - 42,000*(0.07))*0.4] + 2,000 = 12,176 (the first 15,000 is the salvage value, 42,000*(0.07) is the remaining book value (2,940); the difference in bracket [15,000 - 2,940] = 12,060 is the capital gains (taxable); 12,060*(0.4) = 4,824 is the capital gains tax; the last term of 2,000 is the recapture of net working capital, which was invested at t = 0; after tax terminal cash flow is equal to the salvage value – capital gains tax + recapture of net working capital)  

25. Should the firm purchase the new computer?  
(e)  
   a. Yes, since the NPV is $2,505.60 > 0  
   b. Yes, since IRR is 15.84% > 14%  
   c. No, since the NPV is - $2,505.60 < 0  
   d. No, since IRR is 10.84% < 14%  
   e. Both c and d are correct.  
(Since NPV < 0, it is not a good project; or since IRR = 10.84% < 14% = RRR it is not a good project)  

26. The relative risk of a proposed project is best accounted for by  
(a)  
   a. Adjusting the discount rate upward if the project is judged to have above average risk.  
   b. Adjusting the discount rate downward if the project is judged to have above average risk.  
   c. Reducing the NPV by 10% for risky projects.  
   d. Picking a risk factor equal to the average discount rate.  
   e. Ignoring it because project risk cannot be measured accurately.  
(If a project is risky, investors are requiring a higher return. Therefore, firms will adjust the discount rate upward to evaluate risky projects)
27. Which of the following statements is correct? (d)
   a. The internal rate of return method (IRR) is generally regarded by academics as being the best single method for evaluating capital budgeting projects.
   b. The payback method is generally regarded by academics as being the best single method for evaluating capital budgeting projects.
   c. The discounted payback method is generally regarded by academics as being the best single method for evaluating capital budgeting projects.
   d. The net present value method (NPV) is generally regarded by academics as being the best single method for evaluating capital budgeting projects.
   e. The modified internal rate of return method (MIRR) is generally regarded by academics as being the best single method for evaluating capital budgeting projects.
   (NPV is regarded as the best method in evaluating capital budgeting projects by academics)

28. Which of the following statements is correct? Assume that the project being considered has normal cash flows, with one outflow followed by a series of inflows. (c)
   a. A project’s NPV is found by compounding the cash inflows at the IRR to find the terminal value (TV), then discounting the TV at the WACC.
   b. The lower the WACC used to calculate it, the lower the calculated NPV will be.
   c. If a project’s NPV is zero, then its PI must be 1.
   d. If a project’s NPV is greater than zero, then its PI must be greater than zero.
   e. The NPV of a relatively low risk project should be found using a relatively high WACC.
   (Remember the relationship between NPV and PI. When NPV > 0, PI > 1; when NPV < 0, PI < 1; and when NPV = 0, PI = 1)

29. When evaluating a new project, firms should include all the projected cash flows except: (b)
   a. Changes in net working capital attributable to the project.
   b. Previous expenditures associated with a market test to determine the feasibility of the project that have been expensed for tax purposes.
   c. The value of a building owned by the firm that will be used for this project.
   d. A decline in sales of an existing product that is directly related to this project.
   e. Salvage value of assets used for the project at the end of the project’s life.
   (Sunk costs should be ignored in cash flow estimations)
30. A company uses a WACC of 8% for below-average risk projects, 10% for average-risk projects, and 12% for above-average risk projects. Which of the following independent projects should the company accept? (b)

a. Project A has average risk and an IRR = 9%.
b. Project B has below-average risk and an IRR = 8.5%.
c. Project C has above-average risk and an IRR = 11%.
d. All of the projects should be accepted.
e. None of the projects should be accepted.

(If return (IRR) from a project is higher than its WACC (cost of capital) it is a good project)

31. If a firm adheres strictly to the residual dividend model, a sale of new common stock by the company would suggest that (e)

a. the dividend payout ratio has remained constant.
b. the dividend payout ratio is increasing.
c. the dividend payout ratio is decreasing by 20%.
d. the dollar amount of investment has decreased.
e. the dividend payout ratio is zero.

(If a firm adopts the residual dividend policy, issuing new stock to raise money indicates that the firm has no net income or retained earnings left. Therefore, the dividend payout ratio should be zero)

32. Given the debt and equity ratios for NBC, select the optimal capital structure for the company. (b)

a. Debt = 20%; Equity = 80%; EPS = $2.00; Stock price = $25.00.
b. Debt = 40%; Equity = 60%; EPS = $2.25; Stock price = $28.00.
c. Debt = 60%; Equity = 40%; EPS = $2.40; Stock price = $26.50.
d. Debt = 80%; Equity = 20%; EPS = $2.55; Stock price = $23.50.
e. It cannot be determined.

(You don’t need to calculate. Remember the goal of a firm is to maximize the shareholders’ wealth or stock price)

33. As a general rule, the capital structure that (d)

a. Maximizes expected EPS also maximizes the price per share of common stock.
b. Minimizes the interest rate on debt also maximizes the expected EPS.
c. Minimizes the required rate on equity also maximizes the stock price.
d. Maximizes the price per share of common stock also minimizes the WACC.
e. Gives the firm the best credit rating.

(Remember that when the stock price is maximized the WACC is also minimized)
For the next two questions, suppose the following holds:
Smith Technology is expected to generate $150 million in free cash flows (FCF) next year and FCF is expected to grow at a constant rate of 5% per year indefinitely. Smith has no debt and preferred stock, and its WACC is 10%.

34. What is the value of the firm? (d)
   a. $1,500,000,000
   b. $2,000,000,000
   c. $2,500,000,000
   d. $3,000,000,000
   e. None of the above
   (Using the constant growth model to value a firm 150/(0.10 – 0.05) = 3,000,000,000)

35. If Smith has 50 million shares outstanding, what should be the stock price? (c)
   a. $50
   b. $55
   c. $60
   d. $65
   e. None of the above
   (Stock price = value of equity / number of shares = 3,000,000,000 / 50,000,000 = $60/share)

For the next three questions, suppose the following holds:
Buchanan Brothers anticipates that its EBIT at the end of the year will be $4 million (before any recapitalization). The company currently has 600,000 shares of common stock outstanding and has no debt. The company’s stock trades at $40 a share. The company is considering a recapitalization, where it will issue $10 million worth of debt at a YTM of 10% (or $1 million interest expense) and use the proceeds to repurchase stock. Assume the stock price remains unchanged by the transaction, and the company’s tax rate is 40%.

36. What will be the company’s earnings per share if it doesn’t recapitalize? (c)
   a. $3.00
   b. $3.50
   c. $4.00
   d. $4.50
   e. $5.00
   (NI = 4,000,000*(1 – 0.4) = $2,400,000 and EPS = 2,400,000/600,000 = $4.00)

37. What will be the company’s NI if it recapitalizes? (c)
   a. 4,000,000
   b. 3,000,000
   c. 1,800,000
   d. 1,500,000
   e. 1,000,000
   (EBT = 4,000,000 – 10,000,000*0.1 = $3,000,000
   NI = 3,000,000*(1 – 0.4) = $1,800,000)
38. What will be new EPS? (e)

a. $3.23  
   b. $3.75  
   c. $4.14  
   d. $4.82  
   e. $5.14  
(Share repurchased = 10,000,000 / 40 = 250,000 shares  
Shares remaining outstanding = 600,000 – 250,000 = 350,000 shares  
New EPS = 1,800,000 / 350,000 = $5.14/share)

39. The firm’s target capital structure is consistent with which of the following? (e)

a. Maximum earnings per share (EPS)  
b. Minimum cost of debt (r_d)  
c. Highest bond rating  
d. Minimum cost of equity (r_s)  
e. Minimum weighted average cost of capital (WACC)  
(Maximizing shareholders’ wealth is consistent with minimizing WACC)

For the next three questions, suppose the following holds: Flavortech Inc. expects EBIT of $2,000,000 for the coming year. The firm’s capital structure consists of 50% debt and 50% equity, and its marginal tax rate is 40%. The company pays a 10% rate on its $5,000,000 of long-term debt and has 1,000,000 shares of common stock outstanding. In its next capital budgeting cycle, the firm expects to fund one large positive NPV project costing $1,200,000, and it will fund this project in accordance with its target capital structure. The firm follows a residual dividend policy and there are no other projects for the company.

40. What is its expected net income next year? (c)

a. $1,200,000  
b. $1,000,000  
c. $900,000  
d. $850,000  
e. $800,000  
(EBT = 2,000,000 – 5,000,000*(0.1) = 1,500,000; NI = 1,500,000*(1 – 0.4) = $900,000)

41. What is the expected dividend payout ratio?

a. 25.00%  
b. 33.33%  
c. 50.00%  
d. 66.67%  
e. 75.00%  
(The firm will raise $600,000 from debt financing and $600,000 from equity financing; Dividend = NI – R/E = 900,000 – 600,000 = $300,000; Payout ratio = 300,000 / 900,000 = 33.33%)
42. What is the expected DPS? (b)
   a. $0.25  b. $0.30  c. $0.35  d. $0.40  e. None of the above
   \( \text{DPS} = \frac{300,000}{1,000,000} = $0.30/\text{share} \)

43. You are considering two mutually exclusive projects. Project A has an IRR of 10% while project B has an IRR of 15%. When the discount rate is 7% both projects have the same NPV (i.e., 7% is the crossover rate). If the discount rate is 9%, which project has a higher NPV? (b)
   a. Project A
   b. Project B
   c. Either project can have a higher NPV
   d. Both projects should have the same NPV
   e. It is impossible to determine
   (Please refer to the following NPV profile)

<table>
<thead>
<tr>
<th>NPV</th>
<th>A</th>
<th>B</th>
</tr>
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<tbody>
<tr>
<td>IRR</td>
<td>7%</td>
<td>10%</td>
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   ![NPV Profile Diagram]

44. Self-Test questions

45. Problems assigned and sample problems discussed in class