

### Question #1 of 88

Assume that a company has equal amounts of debt, common stock, and preferred stock. An increase in the corporate tax rate of a firm will cause its weighted average cost of capital (WACC) to:

A) fall.



B) rise.



C) more information is needed.



#### Explanation

Recall the WACC equation:

$$\text{WACC} = [w_d \times k_d \times (1 - t)] + (w_{ps} \times k_{ps}) + (w_{ce} \times k_s)$$

The increase in the corporate tax rate will result in a lower cost of debt, resulting in a lower WACC for the company.

(Study Session 10, Module 35.1, LOS 35.a)

### Question #2 of 88

The before-tax cost of debt for Hardcastle Industries, Inc. is currently 8.0%, but it will increase to 8.25% when debt levels reach \$600 million. The debt-to-total assets ratio for Hardcastle is 40% and its capital structure is composed of debt and common equity only. If Hardcastle changes its target capital structure to 50% debt / 50% equity, which of the following describes the effect on the level of new investment at which the cost of debt will increase? The level will:

A) change, but can either increase or decrease.



B) decrease.



C) increase.



#### Explanation

A break point refers to a level of new investment at which a component's cost of capital changes. The formula for break point is:




$$\text{break point} = \frac{\text{amount of capital at which a component's cost of capital changes}}{\text{weight of the component in the capital structure}}$$

As indicated, as the weight of a capital component in the capital structure increases, the break point at which a change in the component's cost will decline. No computation is necessary, but when Hardcastle has 40% debt, the breakpoint is  $\$600,000,000 / 0.4 = \$1.5$  billion. If Hardcastle's debt increases to 50%, the breakpoint will decline to  $\$600,000,000 / 0.5 = \$1.2$  billion.

(Study Session 10, Module 35.2, LOS 35.k)

### Question #3 of 88

Which of the following statements about the role of the marginal cost of capital in determining the net present value of a project is *most* accurate? The marginal cost of capital should be used to discount the cash flows:

- A) for potential projects that have a level of risk near that of the firm's average project. 
- B) if the firm's capital structure is expected to change during the project's life. 
- C) of all projects the firm is considering. 

**Explanation**




Net present values of projects with the average risk for the firm should be determined using the firm's marginal cost of capital. The discount rate should be adjusted for projects with above-average or below-average risk. Using the marginal cost of capital assumes the firm's capital structure does not change over the life of the project.

(Study Session 10, Module 35.1, LOS 35.e)

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### Question #4 of 88

Which one of the following statements about the marginal cost of capital (MCC) is *most* accurate?

- A) The MCC falls as more and more capital is raised in a given period. 
- B) The MCC is the cost of the last dollar obtained from bondholders. 
- C) A breakpoint on the MCC curve occurs when one of the components in the weighted average cost of capital changes in cost. 

**Explanation**

A breakpoint is calculated by dividing the amount of capital at which a component's cost of capital changes by the weight of that component in the capital structure.




The marginal cost of capital (MCC) is defined as the weighted average cost of the last dollar raised by the company. Typically, the marginal cost of capital will *increase* as more capital is raised by the firm. The marginal cost of capital is the weighted average rate across all sources of long-term financings—bonds, preferred stock, and common stock—when the final dollar was obtained, regardless of its specific source.

(Study Session 10, Module 35.2, LOS 35.k)

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### Question #5 of 88

Which of the following is *least likely* to be useful to an analyst when estimating the cost of raising capital through the issuance of non-callable, nonconvertible preferred stock?

- A) The preferred stock's dividend rate. 
- B) The stated par value of the preferred issue. 
- C) The firm's corporate tax rate. 

**Explanation**

The corporate tax rate is not a relevant factor when calculating the cost of preferred stock.

The cost of preferred stock,  $k_{ps}$  is expressed as:

$$k_{ps} = D_{ps} / P$$

where:

$D_{ps}$  = dividend per share = dividend rate  $\times$  stated par value

$P$  = market price

(Study Session 10, Module 35.1, LOS 35.g)

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### Question #6 of 88

To finance a proposed project, Younghan Corporation would need to issue £25 million in common equity. Younghan would receive £23 million in net proceeds from the equity issuance. When analyzing the project, analysts at Younghan should:

- A) add the £2 million flotation cost to the project's initial cash outflow.
- B) not consider the flotation cost because it is a sunk cost.
- C) increase the cost of equity capital to account for the 8% flotation cost.



#### Explanation

The recommended method is to treat flotation costs as a cash outflow at project initiation rather than as a component of the cost of equity.

(Study Session 10, Module 35.2, LOS 35.I)

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### Question #7 of 88

One of the primary limitations of using beta in calculating the cost of equity in a developing country is:

- A) the market portfolio in developing countries is often not well diversified.
- B) beta does not capture inflation risk.
- C) beta does not capture country risk.



#### Explanation

Because beta does not capture country risk, we add a country risk premium to the market risk premium when calculating expected returns using the CAPM.

(Study Session 10, Module 35.2, LOS 35.j)

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### Question #8 of 88

Axle Corporation earned £3.00 per share and paid a dividend of £2.40 on its common stock last year. Its common stock is trading at £40 per share. Axle is expected to have a return on equity of 15%, an effective tax rate of 34%, and to maintain its historic payout ratio going forward. In estimating Axle's after-tax cost of capital, an analyst's estimate of Axle's cost of common equity would be *closest* to:

A) 8.8%.



B) 9.0%.



C) 9.2%.



#### Explanation

We can estimate the company's expected growth rate as  $ROE \times (1 - \text{payout ratio})$ :  $g = 15\% \times (1 - 2.40/3.00) = 3\%$

The expected dividend next period is then  $£2.40(1.03) = £2.47$ . Based on dividend discount model pricing, the required return on equity is  $2.47 / 40 + 3\% = 9.18\%$ .

(Study Session 10, Module 35.1, LOS 35.h)

### Question #9 of 88

Levenworth Industries has the following capital structure on December 31, 2006:

	Book Value	Market Value
Debt outstanding	\$8 million	\$10.5 million
Preferred stock outstanding	\$2 million	\$1.5 million
Common stock outstanding	\$10 million	\$13.7 million
Total capital	\$20 million	\$25.7 million

What is the firm's target debt and preferred stock portion of the capital structure based on existing capital structure?

Debt

Preferred Stock

A) 0.41      0.10



B) 0.40      0.10



C) 0.41      0.06



#### Explanation

The weights in the calculation of WACC should be based on the firm's target capital structure, that is, the proportions (based on market values) of debt, preferred stock, and equity that the firm expects to achieve over time. Book values should not be used. As such, the weight of debt is 41% ( $\$10.5 \div \$25.7$ ), the weight of preferred stock is 6% ( $\$1.5 \div \$25.7$ ) and the weight of common stock is 53% ( $\$13.7 \div \$25.7$ ).

(Study Session 10, Module 35.1, LOS 35.c)

### Question #10 of 88

At a recent Haggerty Semiconductors Board of Directors meeting, Merle Haggerty was asked to discuss the topic of the company's weighted average cost of capital (WACC).

At the meeting Haggerty made the following statements about the company's WACC:

Statement 1: A company creates value by producing a higher return on its assets than the cost of financing those assets. As such, the WACC is the cost of financing a firm's assets and can be viewed as the firm's opportunity cost of financing its assets.

Statement 2: Since a firm's WACC reflects the average risk of the projects that make up the firm, it is not appropriate for evaluating all new projects. It should be adjusted upward for projects with greater-than-average risk and downward for projects with less-than-average risk.

Are Statement 1 and Statement 2, as made by Haggerty *CORRECT*?

	<u>Statement 1</u>	<u>Statement 2</u>	
A) Correct	Correct		✓
B) Incorrect	Correct		✗
C) Correct	Incorrect		✗

#### Explanation

Each statement that Haggerty has made to the board of directors regarding the weighted average cost of capital is correct. New projects should have a return that is higher than the cost to finance those projects.

(Study Session 10, Module 35.1, LOS 35.b)

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### Question #11 of 88

A publicly traded company has a beta of 1.2, a debt/equity ratio of 1.5, ROE of 8.1%, and a marginal tax rate of 40%. The unlevered beta for this company is *closest to*:

- A) 0.832. ✗
- B) 1.071. ✗
- C) 0.632. ✓

#### Explanation

The unlevered beta for this company is calculated as:

$$\beta_{\text{unlevered}} = 1.2 \left[ \frac{1}{1 + (1 - 0.40)1.5} \right] = 0.6316 \approx 0.632$$

(Study Session 10, Module 35.2, LOS 35.i)

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### Question #12 of 88

Affluence Inc. is considering whether to expand its recreational sports division by embarking on a new project. Affluence's capital structure consists of 75% debt and 25% equity and its marginal tax rate is 30%. Aspire Brands is a publicly traded firm that specializes in recreational sports products. Aspire has a debt-to-equity ratio of 1.7, a beta of 0.8, and a marginal tax rate of 35%. Using the pure-play method with Aspire as the comparable firm, the project beta Affluence should use to calculate the cost of equity capital for this project is *closest to*:

A) 0.38.



B) 0.58.



C) 1.18.



#### Explanation

The unlevered asset beta is:

$$\beta_{\text{Aspire asset}} = 0.8 \left[ \frac{1}{1 + (1 - 0.35)1.7} \right] = 0.380$$

Affluence's debt-to-equity ratio =  $0.75/0.25 = 3$ . To calculate the project beta, re-lever the asset beta using Affluence's debt-to-equity ratio and marginal tax rate:

$$\beta_{\text{Affluence project}} = 0.380 [1 + (1 - 0.3)(3)] = 1.178 \approx 1.18$$

(Study Session 10, Module 35.2, LOS 35.i)

### Question #13 of 88

Which of the following is used to illustrate a firm's weighted average cost of capital (WACC) at different levels of capital?

A) Cost of capital component schedule.



B) Schedule of marginal capital break points.



C) Marginal cost of capital schedule.



#### Explanation

The marginal cost of capital schedule shows the WACC at different levels of capital investment. It is usually upward sloping and is a function of a firm's capital structure and its cost of capital at different levels of total capital investment.

(Study Session 10, Module 35.2, LOS 35.k)

### Question #14 of 88

Which of the following statements is *least* accurate regarding the marginal cost of capital's role in determining the net present value (NPV) of a project?

A) When using a firm's marginal cost of capital to evaluate a specific project, there is an implicit assumption that the capital structure of the firm will remain at the target capital structure over the project's life.



B) Projects for which the present value of the after-tax cash inflows is greater than the present value of the after-tax cash outflows should be undertaken by the firm.



C) The NPVs of potential projects of above-average risk should be calculated using the marginal cost of capital for the firm.



#### Explanation

The WACC is the appropriate discount rate for projects that have approximately the same level of risk as the firm's existing projects. This is because the component costs of capital used to calculate the firm's WACC are based on the existing level of firm risk. To evaluate a project with above (the firm's) average risk, a discount rate greater than the firm's existing WACC should be used. Projects with below-average risk should be evaluated using a discount rate less than the firm's WACC. An additional issue to consider when using a firm's WACC (marginal cost of capital) to evaluate a specific project is that there is an implicit assumption that the capital structure of the firm will remain at the target capital structure over the life of the project. These complexities aside, we can still conclude that the NPVs of potential projects of firm-average risk should be calculated using the marginal cost of capital for the firm. Projects for which the present value of the after-tax cash inflows is greater than the present value of the after-tax cash outflows should be undertaken by the firm.

(Study Session 10, Module 35.1, LOS 35.e)

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### Question #15 of 88

The cost of capital for preferred stock is estimated as:

- A) the preferred stock dividend divided by its market price.
- B) the after-tax preferred stock dividend divided by its market price.
- C) the preferred stock dividend divided by its par value.



#### Explanation

The cost of preferred stock =  $D_{ps} / P$ .

(Study Session 10, Module 35.1, LOS 35.g)

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### Question #16 of 88

The following data is regarding the Link Company:

- A target debt/equity ratio of 0.5
- Bonds are currently yielding 10%
- Link is a constant growth firm that just paid a dividend of \$3.00
- Stock sells for \$31.50 per share, and has a growth rate of 5%
- Marginal tax rate is 40%

What is Link's after-tax cost of capital?

- A) 12.5%.
- B) 10.5%.
- C) 12.0%.



#### Explanation

Use the revised form of the constant growth model to determine the cost of equity. Use algebra to determine the weights for the target capital structure realizing that debt is 50% of equity. Substitute 0.5E for D in the formula below.

$$k_s = D_1 \div P_0 + \text{growth} = (3)(1.05) \div (31.50) + 0.05 = 0.15 \text{ or } 15\%$$

$$V = \text{debt} + \text{equity} = 0.5 + 1 = 1.5$$

$$\text{WACC} = (E \div V)(k_s) + (D \div V)(k_{\text{debt}})(1 - t)$$

$$\text{WACC} = (1 \div 1.5)(0.15) + (0.5 \div 1.5)(0.10)(1 - 0.4) = 0.1 + 0.02 = 0.12 \text{ or } 12\%$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #17 of 88

Cullen Casket Company is considering a project that requires a \$175,000 cash outlay and is expected to produce cash flows of \$65,000 per year for the next four years. Cullen's tax rate is 40% and the before-tax cost of debt is 9%. The current share price for Cullen stock is \$32 per share and the expected dividend next year is \$1.50 per share. Cullen's expected growth rate is 5%. Cullen finances the project with 70% newly issued equity and 30% debt, and the flotation costs for equity are 4.5%. What is the dollar amount of the flotation costs attributable to the project, and that is the NPV for the project, assuming that flotation costs are accounted for correctly?

	<u>Dollar amount of flotation costs</u>	<u>NPV of project</u>	
A)	\$5,513	\$30,510	✗
B)	\$5,513	\$32,872	✓
C)	\$7,875	\$30,510	✗

#### Explanation

In order to determine the discount rate, we need to calculate the WACC.

$$\text{After-tax cost of debt} = 9.0\% (1 - 0.40) = 5.40\%$$

$$\text{Cost of equity} = (\$1.50 / \$32.00) + 0.05 = 0.0469 + 0.05 = 0.0969, \text{ or } 9.69\%$$

$$\text{WACC} = 0.70(9.69\%) + 0.30(5.40\%) = 8.40\%$$

Since the project is financed with 70% newly issued equity, the amount of equity capital raised is  $0.70 \times \$175,000 = \$122,500$

Flotation costs are 4.5 percent, which equates to a dollar flotation cost of  $\$122,500 \times 0.045 = \$5,512.50$ .

$$\text{NPV} = -\$175,000 - \$5,513 + \frac{\$65,000}{1.084} + \frac{\$65,000}{(1.084)^2} + \frac{\$65,000}{(1.084)^3} + \frac{\$65,000}{(1.084)^4} = \$32,872$$

(Study Session 10, Module 35.2, LOS 35.I)

### Question #18 of 88



Simcox Financial is considering raising additional capital to finance a takeover of one of the firm's major competitors. Reuben Mellum, an analyst with Simcox, has put together the following schedule of costs related to raising new capital:

Amount of New Debt (in millions)	After-tax Cost of Debt	Amount of New Equity (in millions)	Cost of Equity
\$0 to \$149	4.2%	\$0 to \$399	7.5%
\$150 to \$349	5.0%	\$400 to \$799	8.5%

Assuming that Simcox has a target debt to equity ratio of 65% equity and 35% debt, what are the marginal cost of capital schedule breakpoints for raising additional debt capital and equity capital, respectively?

<u>Breakpoint for new debt capital</u>	<u>Breakpoint for new equity capital</u>	
A) \$375.0 million	\$615.4 million	✗
B) \$428.6 million	\$533.3 million	✗
C) \$428.6 million	\$615.4 million	✓

#### Explanation

A breakpoint is calculated as the amount of capital where component cost changes / weight of component in the WACC. The breakpoint for raising new debt capital occurs at  $(\$150 / 0.35) = \$428.6$  million, and the breakpoint for raising new equity capital occurs at  $(\$400 / 0.65) = \$615.4$  million.

(Study Session 10, Module 35.2, LOS 35.k)

### Question #19 of 88

Hans Klein, CFA, is responsible for capital projects at Vertex Corporation. Klein and his assistant, Karl Schwartz, were discussing various issues about capital budgeting and Schwartz made a comment that Klein believed to be incorrect. Which of the following is *most likely* the *incorrect* statement made by Schwartz?

- A) "The weighted average cost of capital (WACC) should be based on market values for the firm's outstanding securities." ✗
- B) "Net present value (NPV) and internal rate of return (IRR) result in the same rankings of potential capital projects." ✓
- C) "It is not always appropriate to use the firm's marginal cost of capital when determining the net present value of a capital project." ✗

#### Explanation

It is possible that the NPV and IRR methods will give different rankings. This often occurs when there is a significant difference in the timing of the cash flows between two projects. A firm's marginal cost of capital, or WACC, is only appropriate for computing a project's NPV if the project has the same risk as the firm.

(Study Session 10, Module 35.1, LOS 35.c)

### Question #20 of 88

If central bank actions caused the risk-free rate to increase, what is the *most* likely change to cost of debt and equity capital?

- A) One increase and one decrease.
- B) Both decrease.
- C) Both increase.



**Explanation**

An increase in the risk-free rate will cause the cost of equity to increase. It would also cause the cost of debt to increase. In either case, the nominal cost of capital is the risk-free rate plus the appropriate premium for risk.

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #21 of 88

Which of the following is *most* accurate regarding the component costs and component weights in a firm's weighted average cost of capital (WACC)?

- A) The appropriate pre-tax cost of a firm's new debt is the average coupon rate on the firm's existing debt.
- B) The weights in the WACC should be based on the book values of the individual capital components.
- C) Taxes reduce the cost of debt for firms in countries in which interest payments are tax deductible.



**Explanation**

The after-tax cost of debt =  $k_d(1 - t) = k_d - k_d(t)$ , where  $k_d$  is the pretax cost of debt and  $t$  is the effective corporate tax rate. So the tax savings from the tax treatment of debt is  $k_d(t)$ . Capital component weights should be based on market weights, not book values. And, the appropriate pre-tax cost of debt is the yield to maturity on the firm's existing debt.

(Study Session 10, Module 35.1, LOS 35.f)

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### Question #22 of 88

In calculating the weighted average cost of capital (WACC), which of the following statements is *least* accurate?

- A) Different methods for estimating the cost of common equity might produce different results.
- B) The cost of preferred equity capital is the preferred dividend divided by the price of preferred shares.
- C) The cost of debt is equal to one minus the marginal tax rate multiplied by the coupon rate on outstanding debt.



**Explanation**

After-tax cost of debt = bond yield – tax savings =  $k_d - k_d t = k_d(1 - t)$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #23 of 88

A company has the following information:

- A target capital structure of 40% debt and 60% equity.
- \$1,000 par value bonds pay 10% coupon (semi-annual payments), mature in 20 years, and sell for \$849.54.
- The company stock beta is 1.2.
- Risk-free rate is 10%, and market risk premium is 5%.
- The company's marginal tax rate is 40%.

The weighted average cost of capital (WACC) is closest to:

A) 12.5%.



B) 13.5%.



C) 13.0%.



#### Explanation

$$K_S = 0.10 + (0.05)(1.2) = 0.16 \text{ or } 16\%$$

$$K_D = \text{Solve for } i: N = 40, PMT = 50, FV = 1,000, PV = -849.54, CPT I = 6 \times 2 = 12\%$$

$$WACC = (0.4)(12)(1 - 0.4) + (0.6)(16) = 2.88 + 9.6 = 12.48$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #24 of 88

A firm is considering a \$200,000 project that will last 3 years and has the following financial data:

- Annual after-tax cash flows are expected to be \$90,000.
- Target debt/equity ratio is 0.4.
- Cost of equity is 14%.
- Cost of debt is 7%.
- Tax rate is 34%.

Determine the project's payback period and net present value (NPV).

Payback Period    NPV

A) 2.43 years            \$18,716



B) 2.22 years            \$21,872



C) 2.22 years            \$18,716



#### Explanation

### Payback Period

$$\$200,000 / \$90,000 = 2.22 \text{ years}$$

### NPV Method

*First, calculate the weights for debt and equity*

$$w_d + w_e = 1$$

$$w_e = 1 - w_d$$

$$w_d / w_e = 0.40$$

$$w_d = 0.40 \times (1 - w_d)$$

$$w_d = 0.40 - 0.40w_d$$

$$1.40w_d = 0.40$$

$$w_d = 0.286, w_e = 0.714$$

*Second, calculate WACC*

$$\text{WACC} = (w_d \times k_d) \times (1 - t) + (w_e \times k_e) = (0.286 \times 0.07 \times 0.66) + (0.714 \times 0.14) = 0.0132 + 0.100 = 0.1132$$

*Third, calculate the PV of the project cash flows*

$$90 / (1 + 0.1132)^1 + 90 / (1 + 0.1132)^2 + 90 / (1 + 0.1132)^3 = \$218,716$$

*And finally, calculate the project NPV by subtracting out the initial cash flow*

$$\text{NPV} = \$218,716 - \$200,000 = \$18,716$$

(Study Session 10, Module 35.1, LOS 35.a)

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## Question #25 of 88

The *most* accurate way to account for flotation costs when issuing new equity to finance a project is to:

- A) increase the cost of equity capital by dividing it by  $(1 - \text{flotation cost})$ . ✗
- B) adjust cash flows in the computation of the project NPV by the dollar amount of the flotation costs. ✓
- C) increase the cost of equity capital by multiplying it by  $(1 + \text{flotation cost})$ . ✗

### Explanation

Adjusting the cost of equity for flotation costs is incorrect because doing so entails adjusting the present value of cash flows by a fixed percentage over the life of the project. In reality, flotation costs are a cash outflow that occurs at the initiation of a project. Therefore, the correct way to account for flotation costs is to adjust the cash flows in the computation of project NPV, not the cost of equity. The dollar amount of the flotation cost should be considered an additional cash outflow at initiation of the project.

(Study Session 10, Module 35.2, LOS 35.I)

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## Question #26 of 88

A company has the following data associated with it:

- A target capital structure of 10% preferred stock, 50% common equity and 40% debt.
- Outstanding 20-year annual pay 6% coupon bonds selling for \$894.
- Common stock selling for \$45 per share that is expected to grow at 8% and expected to pay a \$2 dividend one year from today.
- Their 5%, \$100 par preferred stock currently sells for \$90.
- The company's tax rate is 40%.

What is the weighted average cost of capital (WACC)?

A) 9.2%.



B) 10.3%.



C) 8.5%.



#### Explanation

After-tax cost of debt:

$$N = 20; FV = 1,000; PMT = 60; PV = -894; CPT I/Y = 7\%$$

$$k_d = (7\%)(1 - 0.4) = 4.2\%$$

Cost of preferred stock:

$$k_{ps} = D_{ps} / P = 5 / 90 = 5.56\%$$

Cost of common equity:

$$k_{ce} = (D_1 / P_0) + g$$

$$k_{ce} = 2 / 45 + 0.08 = 0.1244 = 12.44\%$$

$$WACC = (0.4)(4.2) + (0.1)(5.6) + (0.5)(12.4) = 8.5\%$$

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #27 of 88

A company has \$5 million in debt outstanding with a coupon rate of 12%. Currently the YTM on these bonds is 14%. If the tax rate is 40%, what is the after tax cost of debt?

A) 8.4%.



B) 5.6%.



C) 7.2%.



#### Explanation

$$(0.14)(1 - 0.4)$$

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #28 of 88

BPM Ltd. has the following capital structure: 40% debt and 60% equity. The cost of equity is 16%. Its before tax cost of debt is 8%, and its corporate tax rate is 40%. BPM is considering between two mutually exclusive projects that have the following cash flows:

	Today	Year 1	Year 2	Year 3
Project X	Cost = 100 million	+ 50 million	+ 30 million	+ 50 million
Project Y	Cost = 150 million	+ 50 million	+ 60 million	+ 80 million

Which project should BPM choose?

- A) Project Y because its NPV is \$22 million.
- B) Project X because its NPV is \$5 million.
- C) Project X because its NPV is \$16 million.



#### Explanation

Use the WACC as the discount rate to calculate NPV.

$$\begin{aligned} \text{WACC} &= (w_d \times (k_d \times (1 - T))) + (w_e \times k_e) \\ &= [0.4 \times 0.08 \times (1 - 0.4)] + [0.6 \times 0.16] = 11.52\% \end{aligned}$$

$$\text{NPV of project X} = -100 + 50 / (1.1152) + 30 / (1.1152^2) + 50 / (1.1152^3) = +5.01$$

$$\text{NPV of project Y} = -150 + 50 / (1.1152) + 60 / (1.1152^2) + 80 / (1.1152^3) = +0.76$$

(Study Session 10, Module 35.2, LOS 35.k)

### Question #29 of 88

The after-tax cost of preferred stock is always:

- A) higher than the cost of common shares.
- B) equal to the before-tax cost of preferred stock.
- C) less than the before-tax cost of preferred stock.



#### Explanation

The after-tax cost of preferred stock is equal to the before-tax cost of preferred stock, because preferred stock dividends are not tax deductible. The cost of preferred shares is usually higher than the cost of debt, but less than the cost of common shares.



(Study Session 10, Module 35.1, LOS 35.g)

### Question #30 of 88

In order to more accurately estimate the cost of equity for a company situated in a developing market, an analyst should:

- A) add a country risk premium to the market risk premium when using the capital asset pricing model (CAPM).



- B)** use the yield on the sovereign debt of the developing country instead of the risk free rate when using the capital asset pricing model (CAPM). 
- C)** add a country risk premium to the risk-free rate when using the capital asset pricing model (CAPM). 

**Explanation**




In order to reflect the increased risk when investing in a developing country, a country risk premium is added to the market risk premium when using the CAPM.

(Study Session 10, Module 35.2, LOS 35.j)

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**Question #31 of 88**

A financial analyst is estimating the effect on the cost of capital for a company of a decrease in the marginal tax rate. The company is financed with debt and common equity. A decrease in the firm's marginal tax rate would:

- A)** increase the cost of capital because of a higher after-tax cost of debt. 
- B)** increase the cost of capital because of a higher after-tax cost of debt and equity. 
- C)** decrease the cost of capital because of a lower after-tax cost of debt and equity. 

**Explanation**

The cost of debt capital is affected by the marginal tax rate because interest costs are tax-deductible. A lower marginal tax rate decreases the value to the firm of the tax deduction for interest and therefore increases the after-tax cost of debt capital. Cost of equity capital is not affected by the marginal tax rate.

(Study Session 10, Module 35.1, LOS 35.b)


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**Question #32 of 88**

A company has a target capital structure of 40% debt and 60% equity. The company is a constant growth firm that just paid a dividend of \$2.00, sells for \$27.00 per share, and has a growth rate of 8%.

- The company's bonds pay 10% coupon (semi-annual payout), mature in 20 years, and sell for \$849.54.
- The company's stock beta is 1.2.
- The company's marginal tax rate is 40%.
- The risk-free rate is 10%.
- The market risk premium is 5%.

The company's after-tax cost of debt is:

- A)** 12.0%. 
- B)** 7.2%. 
- C)** 4.8%. 

**Explanation**

Before-tax cost of debt capital:

$$N = 40; PMT = 50; FV = 1,000; PV = 849.54; CPT I/Y = 6\% \times 2 = 12\%$$

After-tax cost of debt capital =  $(12)(1 - 0.4) = 7.2\%$ .

(Study Session 10, Module 35.1, LOS 35.f)

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### Question #33 of 88

The Garden and Home Store recently issued preferred stock paying \$2 annual dividends. The price of its preferred stock is \$20. The after-tax cost of fixed-rate debt capital is 6% and the cost of common stock equity is 12%. The cost of preferred stock is *closest to*:

A) 11%.



B) 9%.



C) 10%.



#### Explanation

Preferred stock pays constant dividends into perpetuity. The price of preferred stock equals the present value of the preferred stock dividends:  $\$20 = \$2 / k_{ps}$ . Therefore, the cost of preferred stock capital equals  $\$2 / \$20 = 0.10 = 10\%$ .

(Study Session 10, Module 35.1, LOS 35.g)

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### Question #34 of 88

The expected annual dividend one year from today is \$2.50 for a share of stock priced at \$25. What is the cost of equity if the constant long-term growth in dividends is projected to be 8%?

A) 15%.



B) 18%.



C) 19%.



#### Explanation

$$K_s = (D_1 / P_0) + g = (2.5/25) + 0.08 = 0.18 \text{ or } 18\%.$$

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #35 of 88



Deighton Industries has 200,000 bonds outstanding. The par value of each corporate bond is \$1,000, and the current market price of the bonds is \$965. Deighton also has 6 million common shares outstanding, with a book value of \$35 per share and a market price of \$28 per share. At a recent board of directors meeting, Deighton board members decided not to change the company's capital structure in a material way for the future. To calculate the weighted average cost of Deighton's capital, what weights should be assigned to debt and to equity?

- |    | <u>Debt</u> | <u>Equity</u> |   |
|----|-------------|---------------|---|
| A) | 48.85%      | 51.15%        | ✗ |
| B) | 53.46%      | 46.54%        | ✓ |
| C) | 56.55%      | 43.45%        | ✗ |

#### Explanation

In order to calculate the weighted average cost of capital (WACC), market value weights should be used.

For the bonds	=	200,000 × \$965	=	\$193,000,000
For the stocks	=	6,000,000 × \$28	=	<u>\$168,000,000</u>
				\$361,000,000

The weight of debt would be:  $193,000,000 / 361,000,000 = 0.5346 = 53.46\%$

The weight of common stock would be:  $168,000,000 / 361,000,000 = 0.4654 = 46.54\%$

(Study Session 10, Module 35.1, LOS 35.c)

### Question #36 of 88

A firm has \$4 million in outstanding bonds that mature in four years, with a fixed rate of 7.5% (assume annual payments). The bonds trade at a price of \$98 in the open market. The firm's marginal tax rate is 35%. Using the bond-yield plus method, what is the firm's cost of equity risk assuming an add-on of 4%?

- |            |   |
|------------|---|
| A) 13.34%. | ✗ |
| B) 11.50%. | ✗ |
| C) 12.11%. | ✓ |

#### Explanation

If the bonds are trading at \$98, the required yield is 8.11%, and the market value of the issue is \$3.92 million. To calculate this rate using a financial calculator (and figuring the rate assuming a \$100 face value for each bond),  $N = 4$ ;  $PMT = 7.5 = (0.075 \times 100)$ ;  $FV = 100$ ;  $PV = -98$ ;  $CPT \rightarrow I/Y = 8.11$ . By adding the equity risk factor of 4%, we compute the cost of equity as 12.11%.

(Study Session 10, Module 35.1, LOS 35.h)

### Question #37 of 88

An analyst gathered the following information for ABC Company, which has a target capital structure of 70% common equity and 30% debt:

Dividend yield	3.50%
Expected market return	9.00%
Risk-free rate	4.00%
Tax rate	40%
Beta	0.90
Bond yield-to-maturity	8.00%

ABC's weighted-average cost of capital is *closest to*:

- A) 8.4%.
- B) 6.9%.
- C) 7.4%.



#### Explanation

The problem must be solved in two steps. First, calculate the cost of equity:

$$\begin{aligned}r_{CE} &= R_f + \beta(R_M - R_f) \\&= 0.04 + 0.9(0.09 - 0.04) \\&= 0.085 = 8.5\%\end{aligned}$$

Next, calculate the WACC.

$$\begin{aligned}\text{WACC} &= w_D r_D(1 - t) + w_P r_P + w_C r_{CE} \\&= (0.30)(0.08)(1 - 0.40) + 0 + (0.70)(0.085) \\&= 0.0739 \text{ or } 7.39\%\end{aligned}$$

(Study Session 10, Module 35.1, LOS 35.h)

### Question #38 of 88

Agora Systems Inc. has the following capital structure and cost of new capital:

	Book Value	Market Value	Cost of Issuing
Debt	\$50 million	\$58 million	5.3%
Preferred stock	\$25 million	\$28 million	7.2%
Common stock	\$200 million	\$525 million	8.0%
Total capital	\$275 million	\$611 million	

What is Agora's weighted-average cost of capital if its marginal tax rate is 40%?

- A) 7.50%.
- B) 6.23%.
- C) 8.02%.



### Explanation

$$WACC = (1 - t) (r_d) (D \div A) + (r_p) (P/A) + (r_{ce}) (E \div A)$$

$$WACC = (1 - 0.4) (0.053) (58 \div 611) + (0.072) (28 \div 611) + (0.08) (525 \div 611)$$

$$WACC = 0.003 + 0.0033 + 0.0687$$

$$WACC = 7.50\%$$

(Study Session 10, Module 35.1, LOS 35.c)

### Question #39 of 88

Meredith Suresh, an analyst with Torch Electric, is evaluating two capital projects. Project 1 has an initial cost of \$200,000 and is expected to produce cash flows of \$55,000 per year for the next eight years. Project 2 has an initial cost of \$100,000 and is expected to produce cash flows of \$40,000 per year for the next four years. Both projects should be financed at Torch's weighted average cost of capital. Torch's current stock price is \$40 per share, and next year's expected dividend is \$1.80. The firm's growth rate is 5%, the current tax rate is 30%, and the pre-tax cost of debt is 8%. Torch has a target capital structure of 50% equity and 50% debt. If Torch takes on either project, it will need to be financed with externally generated equity which has flotation costs of 4%.

Suresh is aware that there are two common methods for accounting for flotation costs. The first method, commonly used in textbooks, is to incorporate flotation costs directly into the cost of equity. The second, and more correct approach, is to subtract the dollar value of the flotation costs from the project NPV. If Suresh uses the cost of equity adjustment approach to account for flotation costs rather than the correct cash flow adjustment approach, will the NPV for each project be overstated or understated?

	<u>Project 1 NPV</u>	<u>Project 2 NPV</u>	
A) Understated	Understated		✗
B) Understated	Overstated		✗
C) Overstated	Overstated		✓

### Explanation

The incorrect method of accounting for flotation costs spreads the flotation cost out over the life of the project by a fixed percentage that does not necessarily reflect the present value of the flotation costs. The impact on project evaluation depends on the length of the project and magnitude of the flotation costs, however, for most projects that are shorter, the incorrect method will overstate NPV, and that is exactly what we see in this problem.

*Correct method of accounting for flotation costs:*

$$\text{After-tax cost of debt} = 8.0\% (1 - 0.30) = 5.60\%$$

$$\text{Cost of equity} = (\$1.80 / \$40.00) + 0.05 = 0.045 + 0.05 = 9.50\%$$

$$\text{WACC} = 0.50(5.60\%) + 0.50(9.50\%) = 7.55\%$$

$$\text{Flotation costs Project 1} = \$200,000 \times 0.5 \times 0.04 = \$4,000$$

$$\text{Flotation costs Project 2} = \$100,000 \times 0.5 \times 0.04 = \$2,000$$

$$\text{NPV Project 1} = -\$200,000 - \$4,000 + (N = 8, I = 7.55\%, \text{PMT} = \$55,000, \text{FV} = 0 \rightarrow \text{CPT PV} = \$321,535) = \$117,535$$

$$\text{NPV Project 2} = -\$100,000 - \$2,000 + (N = 4, I = 7.55\%, \text{PMT} = \$40,000, \text{FV} = 0 \rightarrow \text{CPT PV} = \$133,823) = \$31,823$$

*Incorrect Adjustment for cost of equity method for accounting for flotation costs:*

$$\text{After-tax cost of debt} = 8.0\% (1 - 0.30) = 5.60\%$$

$$\text{Cost of equity} = [\$1.80 / \$40.00(1 - 0.04)] + 0.05 = 0.0469 + 0.05 = 9.69\%$$

$$\text{WACC} = 0.50(5.60\%) + 0.50(9.69\%) = 7.65\%$$

$$\text{NPV Project 1} = -\$200,000 + (N = 8, I = 7.65\%, \text{PMT} = \$55,000, \text{FV} = 0 \rightarrow \text{CPT PV} = \$320,327) = \$120,327$$

$$\text{NPV Project 2} = -\$100,000 + (N = 4, I = 7.65\%, \text{PMT} = \$40,000, \text{FV} = 0 \rightarrow \text{CPT PV} = \$133,523) = \$33,523$$

(Study Session 10, Module 35.2, LOS 35.I)

## Question #40 of 88

Which of the following is *least likely* to be useful to an analyst who is estimating the pretax cost of a firm's fixed-rate debt?

- A) The coupon rate on the firm's existing debt.
- B) The yield to maturity of the firm's existing debt.
- C) Seniority and any special covenants of the firm's anticipated debt.



### Explanation

Ideally, an analyst would use the YTM of a firm's existing debt as the pretax cost of new debt. When a firm's debt is not publicly traded, however, a market YTM may not be available. In this case, an analyst may use the yield curve for debt with the same rating and maturity to estimate the market YTM. If the anticipated debt has unique characteristics that affect YTM, these characteristics should be accounted for when estimating the pretax cost of debt. The cost of debt is the market interest rate (YTM) on new (marginal) debt, not the coupon rate on the firm's existing debt. If you are provided with both coupon and YTM on the exam, you should use the YTM.

(Study Session 10, Module 35.1, LOS 35.f)

## Question #41 of 88

The following is a schedule of Tiger Company's new debt and equity capital costs (\$ millions):

Amount of New Debt	After-tax Cost of Debt	Amount of New Equity	Cost of Equity
< \$30	3.5%	< \$60	8.5%
\$30 – \$60	4.0%	\$60 – \$90	10.3%
> \$60	4.7%	> \$90	12.5%

The company has a target capital structure of 30% debt and 70% equity. Tiger needs to raise an additional \$135.0 million of capital for a new project while maintaining its target capital structure. The company's second debt break point and its marginal cost of capital (MCC) are *closest to*:

	<u>Debt Break Point #2</u>	<u>MCC</u>	
A)	\$200 million	8.4%	✗
B)	\$200 million	10.0%	✓
C)	\$100 million	8.4%	✗

### Explanation

Debt break point #2 = \$60 million / 0.30 = \$200 million.

\$135 million × 30% = \$40.5 million new debt

\$135 million × 70% = \$94.5 million new equity

MCC = 4.0%(0.30) + 12.5%(0.70) = 9.95%.

(Study Session 10, Module 35.2, LOS 35.k)

## Question #42 of 88

The following information applies to World Turn Company:

- 10% rate of interest on newly issued bonds.
- 7% growth rate in earnings and dividends.
- The last dividend paid was \$0.93.
- Shares sell for \$16.
- Stock's beta is 1.5.
- Market risk premium is 6%.
- Risk-free rate of interest is 5%.
- The firm is in a 40% marginal tax bracket.

If the appropriate risk premium relative to the bond yield is 4%, World Turn's equity cost of capital using the dividend discount model is *closest to*:

A)	12.8%.	✗
B)	14.0%.	✗
C)	13.2%.	✓

#### Explanation

$$K_e = \frac{0.93(1.07)}{16} + 0.07 = 13.2\%$$

(Study Session 10, Module 35.1, LOS 35.h)

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#### Question #43 of 88

A new project is expected to be less risky than the average risk of existing projects. The appropriate discount rate to use when evaluating this project is:

- A) less than the firm's marginal cost of capital.
- B) greater than the firm's marginal cost of capital.
- C) the firm's marginal cost of capital.



#### Explanation

If the new project is less risky than the average risk of existing projects, the MCC should be adjusted downward. A lower discount rate will increase project's the net present value.

(Study Session 10, Module 35.1, LOS 35.e)

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#### Question #44 of 88

Assume a firm uses a constant WACC to select investment projects rather than adjusting the projects for risk. If so, the firm will tend to:

- A) accept profitable, low-risk projects and accept unprofitable, high-risk projects.
- B) reject profitable, low-risk projects and accept unprofitable, high-risk projects.
- C) accept profitable, low-risk projects and reject unprofitable, high-risk projects.



#### Explanation

The firm will reject profitable, low-risk projects because it will use a hurdle rate that is too high. The firm should lower the required rate of return for lower risk projects. The firm will accept unprofitable, high-risk projects because the hurdle rate of return used will be too low relative to the risk of the project. The firm should increase the required rate of return for high-risk projects.

(Study Session 10, Module 35.1, LOS 35.a)

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#### Question #45 of 88

A company's outstanding 20-year, annual-pay 6% coupon bonds are selling for \$894. At a tax rate of 40%, the company's after-tax cost of debt capital is *closest* to:

- A) 5.10%
- B) 7.00%
- C) 4.2%.



### Explanation

Pretax cost of debt:  $N = 20$ ;  $FV = 1000$ ;  $PV = -894$ ;  $PMT = 60$ ;  $CPT \rightarrow I/Y = 7\%$




After-tax cost of debt:  $k_d = (7\%)(1 - 0.4) = 4.2\%$

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #46 of 88

Carlos Rodriquez, CFA, and Regine Davis, CFA, were recently discussing the relationships between capital structure, capital budgets, and net present value (NPV) analysis. Which of the following comments made by these two individuals is *least* accurate?

- A) "A break point occurs at a level of capital expenditure where one of the component costs of capital increases." 
- B) "For projects with more risk than the average firm project, NPV computations should be based on the marginal cost of capital instead of the weighted average cost of capital." 
- C) "The optimal capital budget is determined by the intersection of a firm's marginal cost of capital curve and its investment opportunity schedule." 

### Explanation

The marginal cost of capital (MCC) and the weighted average cost of capital (WACC) are the same thing. If a firm's capital structure remains constant, the MCC (WACC) increases as additional capital is raised.

(Study Session 10, Module 35.1, LOS 35.c)




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### Question #47 of 88

Hatch Corporation's target capital structure is 40% debt, 50% common stock, and 10% preferred stock. Information regarding the company's cost of capital can be summarized as follows:

- The company's bonds have a nominal yield to maturity of 7%.
- The company's preferred stock sells for \$40 a share and pays an annual dividend of \$4 a share.
- The company's common stock sells for \$25 a share and is expected to pay a dividend of \$2 a share at the end of the year (i.e.,  $D_1 = \$2.00$ ). The dividend is expected to grow at a constant rate of 7% a year.
- The company has no retained earnings.
- The company's tax rate is 40%.

What is the company's weighted average cost of capital (WACC)?

- A) 10.03% 
- B) 10.59% 
- C) 10.18% 

### Explanation

$$WACC = (w_d)(k_d)(1 - t) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

where:  $w_d = 0.40$

$w_{ce} = 0.50$

$w_{ps} = 0.10$

$k_d = 0.07$

$k_{ps} = D_{ps} / P = 4.00 / 40.00 = 0.10$

$k_{ce} = D_1 / P_0 + g = 2.00 / 25.00 + 0.07 = 0.08 + 0.07 = 0.15$

$WACC = (0.4)(0.07)(1 - 0.4) + (0.1)(0.10) + (0.5)(0.15) = 0.0168 + 0.01 + 0.075 = 0.1018$  or 10.18%

(Study Session 10, Module 35.1, LOS 35.a)

## Question #48 of 88

Arlington Machinery currently has assets on its balance sheet of \$300 million that is financed with 70% equity and 30% debt. The executive management team at Arlington is considering a major expansion that would require raising additional capital. Jeffery Marian, an analyst with Arlington Machinery, has put together the following schedule for the costs of debt and equity:

Amount of New Debt (in millions)	After-tax Cost of Debt	Amount of New Equity (in millions)	Cost of Equity
\$0 to \$49	4.0%	\$0 to \$99	7.0%
\$50 to \$99	4.2%	\$100 to \$199	8.0%
\$100 to \$149	4.5%	\$200 to \$299	9.0%

In a presentation to Arlington's executive management team, Marian makes the following statements:

Statement 1: If we maintain our target capital structure of 70% equity and 30% debt, the breakpoint at which our cost of equity will increase to 9.0% is approximately \$286 million in new capital.

Statement 2: If we want to finance total assets of \$600 million, our weighted average cost of capital (WACC) for the additional financing needed will be 7.56%.

Marian's statements are:

Statement 1      Statement 2

- A) Correct      Correct
- B) Incorrect      Incorrect
- C) Correct      Incorrect



**Explanation**



Marian's first statement is correct. A breakpoint calculated as (amount of capital where component cost changes / weight of component in the WACC). The component cost of equity for Arlington will increase when the amount of new equity raised is \$200 million, which will occur at  $(\$200 \text{ million} / 0.70) = \$285.71 \text{ million}$ , or \$286 million of new capital.

Marian's second statement is also correct. If Arlington wants to finance \$600 million of total assets, the firm will need to raise  $\$600 - \$300 = \$300$  million of additional capital. Using the target capital structure of 70% equity and 30% debt, Arlington will need to raise  $\$300 \times 0.70 = \$210$  million in new equity and  $\$300 \times 0.30 = \$90$  million in new debt. Looking at the capital schedules, these levels of new financing correspond with rates of 9.0% and 4.2% for costs of equity and debt respectively, and the WACC is equal to  $(9.0\% \times 0.70) + (4.2\% \times 0.30) = 7.56\%$ .

(Study Session 10, Module 35.2, LOS 35.k)

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### Question #49 of 88

The cost of preferred stock is equal to the preferred stock dividend:

A) multiplied by the market price.



B) divided by its par value.



C) divided by the market price.



#### Explanation

The cost of preferred stock,  $k_{ps}$ , is  $D_{ps} \div \text{price}$ .

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #50 of 88

Ravencroft Supplies is estimating its weighted average cost of capital (WACC). Ravencroft's optimal capital structure includes 10% preferred stock, 30% debt, and 60% equity. They can sell additional bonds at a rate of 8%. The cost of issuing new preferred stock is 12%. The firm can issue new shares of common stock at a cost of 14.5%. The firm's marginal tax rate is 35%. Ravencroft's WACC is *closest* to:

A) 13.3%.



B) 11.5%.



C) 12.3%.



#### Explanation

$0.10(12\%) + 0.30(8\%)(1 - 0.35) + 0.6(14.5\%) = 11.46\%$ .

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #51 of 88

Enamel Manufacturing (EM) is considering investing in a new vehicle. EM finances new projects using retained earnings and bank loans. This new vehicle is expected to have the same level of risk as the typical investment made by EM. Which one of the following should the firm use in making its decision?

A) Cost of retained earnings.



B) Marginal cost of capital.



C) After-tax cost of debt.



#### Explanation

The marginal cost of capital represents the cost of raising an additional dollar of capital. The cost of retained earnings would only be appropriate if the company avoided creditor-supplied financing or the issuance of new common or preferred stock (and preferred stock financing). The after-tax cost of debt is never sufficient, because a business, regardless of their size, always has a residual owner, and hence a cost of equity.

(Study Session 10, Module 35.1, LOS 35.d)

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### Question #52 of 88

A company has the following capital structure:

- Target weightings: 30% debt, 20% preferred stock, 50% common equity.
- Tax Rate: 35%.
- The firm can issue \$1,000 face value, 7% semi-annual coupon debt with a 15-year maturity for a price of \$1,047.46.
- A preferred stock issue that pays a dividend of \$2.80 has a value of \$35 per share.
- The company's growth rate is estimated at 6%.
- The company's common shares have a value of \$40 and a dividend in year 0 of  $D_0 = \$3.00$ .

The company's weighted average cost of capital is *closest* to:

A) 9.28%.



B) 9.84%.



C) 10.53%.



#### Explanation

Step 1: Determine the after-tax cost of debt:

The *after-tax cost of debt* [ $k_d (1 - t)$ ] is used to compute the weighted average cost of capital. It is the interest rate on new debt ( $k_d$ ) less the tax savings due to the deductibility of interest ( $k_d t$ ).

Here, we are given the inputs needed to calculate  $k_d$ :  $N = 15 \times 2 = 30$ ;  $PMT = (1,000 \times 0.07) / 2 = 35$ ;  $FV = 1,000$ ;  $PV = -1,047.46$ ;  $CPT \rightarrow I = 3.25$ , multiply by 2 = 6.50%.

Thus,  $k_d (1 - t) = 6.50\% \times (1 - 0.35) = \mathbf{4.22\%}$

Step 2: Determine the cost of preferred stock:

Preferred stock is a perpetuity that pays a fixed dividend ( $D_{ps}$ ) forever. The *cost of preferred stock* ( $k_{ps}$ ) =  $D_{ps} / P$

where:  $D_{ps}$  = preferred dividends.  $P$  = price

Here,  $k_{ps} = D_{ps} / P = \$2.80 / \$35 = 0.08$ , or **8.0%**.

Step 3: Determine the cost of common equity:

$k_{ce} = (D_1 / P_0) + g$

where:  $D_1$  = Dividend in next year  $P_0$  = Current stock price  $g$  = Dividend growth rate

Here,  $D_1 = D_0 \times (1 + g) = \$3.00 \times (1 + 0.06) = \$3.18$ .

$k_{ce} = (3.18 / 40) + 0.06 = 0.1395$  or **13.95%**.

Step 4: Calculate WACC:

$WACC = (w_d)(k_d) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$

where  $w_d$ ,  $w_{ps}$ , and  $w_{ce}$  are the weights used for debt, preferred stock, and common equity.

Here,  $WACC = (0.30 \times 4.22\%) + (0.20 \times 8.0\%) + (0.50 \times 13.95\%) = \mathbf{9.84\%}$ .




*Note:* Your calculation may differ slightly, depending on whether you carry all calculations in your calculator, or round to two decimals and then calculate.

(Study Session 10, Module 35.1, LOS 35.a)

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## Question #53 of 88

The optimal capital budget is the amount of capital determined by the:

- A) downward sloping marginal cost of capital curve's intersection with a upward sloping investment opportunity schedule. 
- B) upward sloping marginal cost of capital curve's intersection with a downward sloping investment opportunity schedule. 
- C) point of tangency between the marginal cost of capital curve and the investment opportunity schedule. 

### Explanation




The marginal cost of capital increases as additional capital is raised, which means the curve is upward sloping. The investment opportunity schedule slopes downward, representing the diminishing returns of additional capital invested. The point where the two curves intersect is the firm's optimal capital budget, the amount of capital that will finance all the projects that have positive net present values.

(Study Session 10, Module 35.1, LOS 35.d)

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### Question #54 of 88

A North American investment society held a panel discussion on the topics of capital costs and capital budgeting. Which of the following comments made during this discussion is the *least* accurate?

- A) Any given project's NPV will decline when a breakpoint is reached. 
- B) A project's internal rate of return decreases when a breakpoint is reached. 
- C) An increase in the after-tax cost of debt may occur at a break point. 

#### Explanation




The internal rate of return is independent of the firm's cost of capital. It is a function of the amount and timing of a project's cash flows.

(Study Session 10, Module 35.2, LOS 35.k)

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### Question #55 of 88

Ferryville Radar Technologies has five-year, 7.5% notes outstanding that trade at a yield to maturity of 6.8%. The company's marginal tax rate is 35%. Ferryville plans to issue new five-year notes to finance an expansion. Ferryville's cost of debt capital is *closest* to:

- A) 4.9%. 
- B) 2.4%. 
- C) 4.4%. 

#### Explanation

Ferryville's cost of debt capital is  $k_d(1 - t) = 6.8\% \times (1 - 0.35) = 4.42\%$ . Note that the before-tax cost of debt is the yield to maturity on the company's outstanding notes, not their coupon rate. If the expected yield on new par debt were known, we would use that. Since it is not, the yield to maturity on existing debt is the best approximation.

(Study Session 10, Module 35.1, LOS 35.f)

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### Question #56 of 88

Elenore Rice, CFA, is asked to determine the appropriate weighted average cost of capital for Samson Brick Company. Rice is provided with the following data:

- Debt outstanding, market value \$10 million
- Common stock outstanding, market value \$30 million
- Marginal tax rate 40%
- Cost of common equity 12%
- Cost of debt 8%

Samson has no preferred stock. Assuming Samson's ratios reflect the firm's target capital structure, Samson's weighted average cost of capital is *closest* to:

- A) 9.8%.
- B) 10.4%.
- C) 10.2%.



#### Explanation

The capital structure ratios are:

- Debt to total capital = \$10 / \$40 = 25%
- Equity to total capital = \$30 / \$40 = 75%

The formula for the WACC (if no preferred stock) is:

$$WACC = w_d k_d (1 - t) + w_{ce} k_{ce}$$

where  $w_d$  is the percentage of operations financed by debt,  $w_{ce}$  is the percentage of operations financed by equity,  $t$  is the marginal tax rate,  $k_d$  is the before-tax cost of debt, and  $k_{ce}$  is the cost of common equity.

$$WACC = 0.25(0.08)(0.60) + 0.75(0.12) = 0.102 = 10.2\%.$$

(Study Session 10, Module 35.1, LOS 35.b)

#### Question #57 of 88

DeSoto Corp. 8% coupon bonds have a yield to maturity of 7.5%. The firm's tax rate is 30%. The after-tax cost of debt is *closest* to:

- A) 5.6%.
- B) 5.3%.
- C) 7.5%.



#### Explanation

$$7.5 \times (1 - 0.3) = 5.25\%.$$

(Study Session 10, Module 35.1, LOS 35.f)

#### Question #58 of 88

Which of the following choices *best* describes the role of taxes on the after-tax cost of capital in the U.S. from the different capital sources?

Common equity   Preferred equity   Debt

- |              |           |           |  |
|--------------|-----------|-----------|--|
| A) No effect | No effect | Decrease  |  |
| B) No effect | Decrease  | Decrease  |  |
| C) Decrease  | Decrease  | No effect |  |

#### Explanation

In the U.S., interest paid on corporate debt is tax deductible, so the after-tax cost of debt capital is less than the before-tax cost of debt capital. Dividend payments are not tax deductible, so taxes do not decrease the cost of common or preferred equity.

(Study Session 10, Module 35.1, LOS 35.b)

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### Question #59 of 88

The following information applies to a corporation:

- The company has \$200 million of equity and \$100 million of debt.
- The company recently issued bonds at 9%.
- The corporate tax rate is 30%.
- The company's beta is 1.125.

If the risk-free rate is 6% and the expected return on the market portfolio is 14%, the company's after-tax weighted average cost of capital is *closest to*:

A) 10.5%.



B) 11.2%.



C) 12.1%.



#### Explanation

$$k_s = \text{RFR} + \beta(\text{R}_m - \text{RFR})$$

$$= 6\% + 1.125(14\% - 6\%) = 15\%$$

$$\text{WACC} = [D/(D + E)] \times k_d(1 - t) + [E/(D + E)] \times k_s$$

$$= (100/300)(9\%)(1 - 0.3) + (200/300)(15\%) = 12.1\%$$

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #60 of 88

Genoa Corp. pays 40% of its earnings out in dividends. The return on equity (ROE) is 15%. Last year's earnings were \$5.00 per share and the dividend was just paid to shareholders. The current price of shares is \$42.00. The firm's tax rate is 30%. The cost of common equity is *closest to*:

A) 16.1%.



B) 13.8%.



C) 14.2%.



#### Explanation

$$\text{ROE} \times \text{retention ratio} = \text{growth rate}$$

$$15\% \times (1 - 0.40) = 9\%$$

$$D_0 = \$5.00 \times 0.40 = \$2.00$$

$$[\$2.00(1.09) / \$42.00] + 0.09 = 14.19\%$$

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #61 of 88

Which of the following events will *reduce* a company's weighted average cost of capital (WACC)?

- A) A reduction in the market risk premium.
- B) An increase in expected inflation.
- C) A reduction in the company's bond rating.



#### Explanation

An increase in either the company's beta or the market risk premium will cause the WACC to increase using the CAPM approach. A reduction in the market risk premium will reduce the cost of equity for WACC.

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #62 of 88

Julius, Inc., is in a 40% marginal tax bracket. The firm can raise as much capital as needed in the bond market at a cost of 10%. The preferred stock has a fixed dividend of \$4.00. The price of preferred stock is \$31.50. The after-tax costs of debt and preferred stock are *closest* to:

	<u>Debt</u>	<u>Preferred stock</u>
A)	6.0%	7.6%
B)	10.0%	7.6%
C)	6.0%	12.7%



#### Explanation

After-tax cost of debt =  $10\% \times (1 - 0.4) = 6\%$ .

Cost of preferred stock =  $\$4 / \$31.50 = 12.7\%$ .

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #63 of 88

A company primarily engaged in the production of cement has the following characteristics:

- Beta = 0.8.
- Market value debt = \$180 million.
- Market value equity = \$540 million.
- Effective tax rate = 25%.
- Marginal tax rate = 34%.

The asset beta that should be used by a company considering entering into cement production is *closest* to:

- A) 0.725.



B) 0.656.



C) 0.640.



#### Explanation

The unlevered (asset) beta is  $0.8\{1 / [1 + (1 - 0.34)(180 / 540)]\} = 0.656$ .

(Study Session 10, Module 35.2, LOS 35.i)

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### Question #64 of 88

Nippon Post Corporation (NPC), a Japanese software development firm, has a capital structure that is comprised of 60% common equity and 40% debt. In order to finance several capital projects, NPC will raise USD1.6 million by issuing common equity and debt in proportion to its current capital structure. The debt will be issued at par with a 9% coupon and flotation costs on the equity issue will be 3.5%. NPC's common stock is currently selling for USD21.40 per share, and its last dividend was USD1.80 and is expected to grow at 7% forever. The company's tax rate is 40%. NPC's WACC based on the cost of new capital is *closest* to:

A) 11.8%.



B) 9.6%.



C) 13.1%.



#### Explanation

$$k_D = 0.09(1 - 0.4) = 0.054 = 5.4\%$$

$$k_{CE} = [(1.80 \times 1.07) / 21.40] + 0.07 = 0.16 = 16.0\%$$

$$WACC = 0.6(16.0\%) + 0.4(5.4\%) = 11.76\%$$

Flotation costs, treated correctly, have no effect on the cost of equity component of the WACC.

(Study Session 10, Module 35.2, LOS 35.l)

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### Question #65 of 88

The expected dividend one year from today is \$2.50 for a share of stock priced at \$22.50. The long-term growth in dividends is projected at 8%. The cost of common equity is *closest* to:

A) 15.6%.



B) 19.1%.



C) 18.0%.



#### Explanation

$$K_{CE} = (D_1 / P_0) + g$$

$$K_{CE} = [2.50 / 22.50] + 0.08 = 0.19111, \text{ or } 19.1\%$$

(Study Session 10, Module 35.1, LOS 35.h)

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## Question #66 of 88

Degen Company is considering a project in the commercial printing business. Its debt currently has a yield of 12%. Degen has a debt-to-equity ratio of 1.3 and a marginal tax rate of 30%. Hodgkins Inc., a publicly traded firm that operates only in the commercial printing business, has a marginal tax rate of 25%, a debt-to-equity ratio of 2.0, and an equity beta of 1.3. If the risk-free rate is 3% and the expected return on the market portfolio is 9%, the appropriate WACC to use in evaluating Degen's project is *closest to*:

A) 8.6%.



B) 9.2%.



C) 8.9%.



### Explanation

Hodgkins' asset (unlevered) beta:

$$\beta_{\text{ASSET}} = 1.3 \left[ \frac{1}{1 + (1 - 0.25)(2.0)} \right] = 0.52$$

We are given Degen's leverage ratio (assets-to-equity) as equal to 2.3. If we assign the value of 1 to equity ( $A/E = 2.3/1$ ), then debt (and the debt-to-equity ratio) must be  $2.3 - 1 = 1.3$ .

Equity beta for the project:

$$\beta_{\text{PROJECT}} = 0.52[1 + (1 - 0.3)(1.3)] = 0.9932$$

$$\text{Project cost of equity} = 3\% + 0.9932(9\% - 3\%) = 8.96\%$$

Degen's capital structure weight for debt is  $1.3/2.3 = 56.5\%$ , and its weight for equity is  $1/2.3 = 43.5\%$ .

The appropriate WACC for the project is therefore:  $0.565(12\%)(1 - 0.3) + 0.435(8.96\%) = 8.64\%$ .

(Study Session 10, Module 35.2, LOS 35.i)

## Question #67 of 88

Helmut Humm, manager at a large U.S. firm, has just been assigned to the capital budgeting area to replace a person who left suddenly. One of Humm's first tasks is to calculate the company's weighted average cost of capital (WACC) – and fast! The CEO is scheduled to present to the board in half an hour and needs the WACC – now! Luckily, Humm finds clear notes on the target capital component weights. Unfortunately, all he can find for the cost of capital components is some handwritten notes. He can make out the numbers, but not the corresponding capital component. As time runs out, he has to guess.

Here is what Humm deciphered:

- Target weights:  $w_d = 30\%$ ,  $w_{ps} = 20\%$ ,  $w_{ce} = 50\%$ , where  $w_d$ ,  $w_{ps}$ , and  $w_{ce}$  are the weights used for debt, preferred stock, and common equity.
- Cost of components (in no particular order): 6.0%, 15.0%, and 8.5%.
- The cost of debt is the after-tax cost.

If Humm guesses correctly, the WACC is:

A) 9.0%.



B) 9.2%.



C) 11.0%.



### Explanation

If Humm remembers to order the capital components from cheapest to most expensive, he can calculate WACC. The order from cheapest to most expensive is: debt, preferred stock (which acts like a hybrid of debt and equity), and common equity.

Then, using the formula for  $WACC = (w_d)(k_d) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$

where  $w_d$ ,  $w_{ps}$ , and  $w_e$  are the weights used for debt, preferred stock, and common equity.


$$WACC = (0.30 \times 6.0\%) + (0.20 \times 8.5\%) + (0.50 \times 15.00\%) = \mathbf{11.0\%}.$$

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #68 of 88

Which of the following statements is *most* accurate regarding a firm's cost of preferred shares? A firm's cost of preferred stock is:

**A)** approximately equal to the market price of the firm's debt as a percentage of the market price of its common shares. 

**B)** the market price of the preferred shares as a percentage of its issuance price. 

**C)** the dividend yield on the firm's newly-issued preferred stock. 

### Explanation


The newly-issued preferred shares of most companies generally sell at par. As such, the dividend yield on a firm's newly-issued preferred shares is the market's required rate of return. The yield on a BBB corporate bond reflects a pre-tax cost of debt. Both remaining choices make no sense.

(Study Session 10, Module 35.1, LOS 35.g)

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### Question #69 of 88

Justin Lopez, CFA, is the Chief Financial Officer of Waterbury Corporation. Lopez has just been informed that the U.S. Internal Revenue Code may be revised such that the maximum marginal corporate tax rate will be increased. Since Waterbury's taxable income is routinely in the highest marginal tax bracket, Lopez is concerned about the potential impact of the proposed change. Assuming that Waterbury maintains its target capital structure, which of the following is *least likely* to be affected by the proposed tax change?

**A)** Waterbury's after-tax cost of corporate debt. 

**B)** Waterbury's after-tax cost of noncallable, nonconvertible preferred stock. 

**C)** Waterbury's return on equity (ROE). 

### Explanation

Corporate taxes do not affect the cost of preferred stock to the issuing firm. Waterbury's after-tax cost of debt, and consequently, its weighted average cost of capital will decrease because the tax savings on interest will increase. Also, since taxes impact net income, Waterbury's ROE will be affected by the change.

(Study Session 10, Module 35.1, LOS 35.g)

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## Question #70 of 88

A firm is planning a \$25 million expansion project. The project will be financed with \$10 million in debt and \$15 million in equity stock (equal to the company's current capital structure). The before-tax required return on debt is 10% and 15% for equity. If the company is in the 35% tax bracket, what cost of capital should the firm use to determine the project's net present value (NPV)?

- A) 9.6%.
- B) 11.6%.
- C) 12.5%.



### Explanation

$$WACC = (E / V)(R_E) + (D / V)(R_D)(1 - TC)$$

$$WACC = (15 / 25)(0.15) + (10 / 25)(0.10)(1 - 0.35) = 0.09 + 0.026 = 0.116 \text{ or } 11.6\%$$

(Study Session 10, Module 35.1, LOS 35.a)

## Question #71 of 88

A company has a target capital structure of 40% debt and 60% equity. The company is a constant growth firm that just paid a dividend of \$2.00, sells for \$27.00 per share, and has a growth rate of 8%.

- The company's bonds pay 10% coupon (semi-annual payout), mature in 20 years, and sell for \$849.54.
- The company's stock beta is 1.2.
- The company's marginal tax rate is 40%.
- The risk-free rate is 10%.
- The market risk premium is 5%.

The cost of equity using the capital asset pricing model (CAPM) approach and the discounted cash flow approach is:

	<u>CAPM</u>	<u>Discounted cash flow</u>	
A)	16.0%	16.0%	
B)	16.6%	15.4%	
C)	16.0%	15.4%	

### Explanation

CAPM approach:

$$10 + (5)(1.2) = 16\%.$$

Discounted cash flow approach:

$$\text{Next-period dividend} = 2(1.08) = 2.16$$

$$(2.16 / 27) + 0.08 = 16\%$$

(Study Session 10, Module 35.1, LOS 35.h)

### Question #72 of 88

A firm has \$100 in equity and \$300 in debt. The firm recently issued bonds at the market required rate of 9%. The firm's beta is 1.125, the risk-free rate is 6%, and the expected return in the market is 14%. Assume the firm is at their optimal capital structure and the firm's tax rate is 40%. What is the firm's weighted average cost of capital (WACC)?

A) 8.6%.



B) 7.8%.



C) 5.4%.



#### Explanation

$$\text{CAPM} = R_E = R_F + B(R_M - R_F) = 0.06 + (1.125)(0.14 - 0.06) = 0.15$$

$$\text{WACC} = (E \div V)(R_E) + (D \div V)(R_D)(1 - t)$$

$$V = 100 + 300 = 400$$

$$\text{WACC} = (1 \div 4)(0.15) + (3 \div 4)(0.09)(1 - 0.4) = 0.078$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #73 of 88

The marginal cost of capital is:

A) equal to the firm's weighted cost of funds.



B) the cost of the last dollar raised by the firm.



C) tied solely to the specific source of financing.



#### Explanation

The "marginal" cost refers to the last dollar of financing acquired by the firm assuming funds are raised in the same proportion as the target capital structure. It is a percentage value based on both the returns required by the last bondholders *and* stockholders to provide capital to the firm. Regardless of whether the funding came from bondholders or stockholders, both debt and equity are needed to fund projects.

(Study Session 10, Module 35.1, LOS 35.d)

### Question #74 of 88

Stolzenbach Technologies has a target capital structure of 60% equity and 40% debt. The schedule of financing costs for the Stolzenbach is shown in the table below:

Amount of New Debt (in millions)	After-tax Cost of Debt	Amount of New Equity (in millions)	Cost of Equity
\$0 to \$199	4.5%	\$0 to \$299	7.5%
\$200 to \$399	5.0%	\$300 to \$699	8.5%
\$400 to \$599	5.5%	\$700 to \$999	9.5%

Stolzenbach Technologies has breakpoints for raising additional financing at both:

A) \$500 million and \$1,000 million.



B) \$400 million and \$700 million.



C) \$500 million and \$700 million.



#### Explanation

Stolzenbach will have a break point each time a component cost of capital changes, for a total of three marginal cost of capital schedule breakpoints.

$$\text{Break point}_{\text{Debt} > \$200\text{mm}} = (\$200 \text{ million} \div 0.4) = \$500 \text{ million}$$

$$\text{Break point}_{\text{Debt} > \$400\text{mm}} = (\$400 \text{ million} \div 0.4) = \$1,000 \text{ million}$$

$$\text{Break point}_{\text{Equity} > \$300\text{mm}} = (\$300 \text{ million} \div 0.6) = \$500 \text{ million}$$

$$\text{Break point}_{\text{Equity} > \$700\text{mm}} = (\$700 \text{ million} \div 0.6) = \$1,167 \text{ million}$$

(Study Session 10, Module 35.2, LOS 35.k)

### Question #75 of 88

A \$100 par, 8% preferred stock is currently selling for \$80. What is the cost of preferred equity?

A) 10.8%.



B) 10.0%.



C) 8.0%.



#### Explanation

$$k_{PS} = \$8 / \$80 = 10\%$$

(Study Session 10, Module 35.1, LOS 35.h)

### Question #76 of 88

The 6% semiannual coupon, 7-year notes of Woodbine Transportation, Inc. trade for a price of 94.54. What is the company's after-tax cost of debt capital if its marginal tax rate is 30%?

A) 4.9%.



B) 4.2%.



C) 2.1%.



#### Explanation

To determine Woodbine's before-tax cost of debt, find the yield to maturity on its outstanding notes:

$$PV = -94.54; FV = 100; PMT = 6 / 2 = 3; N = 14; CPT \rightarrow I/Y = 3.50 \times 2 = 7\%$$

Woodbine's after-tax cost of debt is  $k_d(1 - t) = 7\%(1 - 0.3) = 4.9\%$

(Study Session 10, Module 35.1, LOS 35.f)

### Question #77 of 88

A company has the following data associated with it:

- A target capital structure of 10% preferred stock, 50% common equity and 40% debt.
- Outstanding 20-year annual pay 6% coupon bonds selling for \$894.
- Common stock selling for \$45 per share that is expected to grow at 8% and expected to pay a \$2 dividend one year from today.
- Their \$100 par preferred stock currently sells for \$90 and is earning 5%.
- The company's tax rate is 40%.

What is the after-tax cost of debt capital and after-tax cost of preferred stock?

	<u>Debt capital</u>	<u>Preferred stock</u>	
A) 4.5%	3.3%		
B) 4.2%	3.3%		
C) 4.2%	5.6%		

#### Explanation

Debt:

$$N = 20; FV = 1,000; PMT = 60; PV = -894; CPT I/Y = 7\%$$

$$k_d = (7\%)(1 - 0.4) = 4.2\%$$

Preferred stock:

$$k_{ps} = D_{ps} / P = 5 / 90 = 5.56\%$$

Note that the cost of preferred stock is not adjusted for taxes because preferred dividends are usually not tax-deductible.

(Study Session 10, Module 35.1, LOS 35.g)

### Question #78 of 88

A company is planning a \$50 million expansion. The expansion is to be financed by selling \$20 million in new debt and \$30 million in new common stock. The before-tax required return on debt is 9% and the required return for equity is 14%. If the company is in the 40% tax bracket, the marginal weighted average cost of capital is *closest* to:

- A) 9.0%.
- B) 10.0%
- C) 10.6%.



**Explanation**

$$(0.4)(9\%)(1 - 0.4) + (0.6)(14\%) = 10.56\%$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #79 of 88

An analyst gathered the following data about a company:

Capital Structure	Required Rate of Return
30% debt	10% for debt
20% preferred stock	11% for preferred stock
50% common stock	18% for common stock

Assuming a 40% tax rate, what after-tax rate of return must the company earn on its investments?

- A) 10.0%.
- B) 13.0%.
- C) 14.2%.



**Explanation**

$$(0.3)(0.1)(1 - 0.4) + (0.2)(0.11) + (0.5)(0.18) = 0.13$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #80 of 88

Hanson Aluminum, Inc. is considering whether to build a mill based around a new rolling technology the company has been developing. Management views this project as being riskier than the average project the company undertakes. Based on their analysis of the projected cash flows, management determines that the project's internal rate of return is equal to the company's marginal cost of capital. If the project goes forward, the company will finance it with newly issued debt with an after-tax cost less than the project's IRR. Should management accept or reject this project?

- A) Reject, because the project reduces the value of the company when its risk is taken into account.
- B) Accept, because the marginal cost of the new debt is less than the project's internal rate of return.
- C) Accept, because the project returns the company's cost of capital.



**Explanation**

The marginal (or weighted average) cost of capital is the appropriate discount rate for projects that have the same level of risk as the firm's existing projects. For a project with a higher degree of risk, cash flows should be discounted at a rate higher than the firm's WACC. Since this project's IRR is equal to the company's WACC, its NPV must be zero if the cash flows are discounted at the WACC. If the cash flows are discounted at a rate higher than the WACC to account for the project's higher risk, the NPV must be negative. Therefore, the project would reduce the value of the company, so management should reject it. A company considers its capital raising and budgeting decisions independently. Each investment decision must be made assuming a WACC which includes each of the different sources of capital and is based on the long-run target weights.

(Study Session 10, Module 35.1, LOS 35.e)

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### Question #81 of 88

The debt of Savanna Equipment, Inc. has an average maturity of ten years and a BBB rating. A market yield to maturity is not available because the debt is not publicly traded, but the market yield on debt with similar characteristics is 8.33%. Savanna is planning to issue new ten-year notes that would be subordinate to the firm's existing debt. The company's marginal tax rate is 40%. The *most* appropriate estimate of the after-tax cost of this new debt is:

A) More than 5.0%.



B) Between 3.3% and 5.0%.



C) 5.0%.



#### Explanation

The after-tax cost of debt similar to Savanna's existing debt is  $k_d(1 - t) = 8.33\%(1 - 0.4) = 5.0\%$ . Because the anticipated new debt will be subordinated in the company's debt structure, investors will demand a higher yield than the existing debt carries. Therefore, the appropriate after-tax cost of the new debt is more than 5.0%.

(Study Session 10, Module 35.1, LOS 35.f)

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### Question #82 of 88

When calculating the weighted average cost of capital (WACC) an adjustment is made for taxes because:

A) equity earns higher return than debt.



B) the interest on debt is tax deductible.



C) equity is risky.



#### Explanation

Equity and preferred stock are not adjusted for taxes because dividends are not deductible for corporate taxes. Only interest expense is deductible for corporate taxes.

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #83 of 88



An analyst gathered the following information about a capital budgeting project:

- The proposed project cost \$10,000.
- The project is expected to increase pretax net income and cash flow by \$3,000 in each of the next eight years.
- The company has 50% of its capital in equity at a cost of 12%.
- The pretax cost of debt capital is 6%.
- The company's tax rate is 33%.

The project's net present value is *closest to*:

A) \$1,551.



B) \$7,240.



C) \$6,604.



#### Explanation

$$WACC = (w_d)(k_d)(1 - t) + (w_{ce})(k_{ce})$$

$$WACC = (0.5)(6\%)(1 - 0.33) + (0.5)(12\%) = 8.0\%$$

The increase in after-tax cash flows for each year is  $3,000 \times (1 - 0.33) = \$2,010$ .

$$I = 8; N = 8; PMT = \$2,010; CPT \rightarrow PV = \$11,550.74$$

$$NPV = PV \text{ income} - \text{cost} = \$11,550.74 - \$10,000 = \$1,550.74$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #84 of 88

Given the following information about capital structure, compute the WACC. The marginal tax rate is 40%.

Type of Capital	Percent of Capital Structure	Before-Tax Component Cost
Bonds	40%	7.5%
Preferred Stock	5%	11.0%
Common Stock	55%	15.0%

A) 10.6%.



B) 13.3%.



C) 7.1%.



#### Explanation

$$WACC = (W_d)(K_d (1 - t)) + (W_{ps})(K_{ps}) + (W_{ce})(K_s)$$

$$WACC = 0.4(7.5\%)(1 - 0.4) + 0.05(11\%) + 0.55(15\%) = 10.6\%.$$

(Study Session 10, Module 35.1, LOS 35.a)

### Question #85 of 88

Tony Costa, operations manager of BioChem Inc., is exploring a proposed product line expansion. Costa explains that he estimates the beta for the project by seeking out a publicly traded firm that is engaged exclusively in the same business as the proposed BioChem product line expansion. The beta of the proposed project is estimated from the beta of that firm after appropriate adjustments for capital structure differences. The method that Costa uses is known as the:

A) pure-play method.



B) build-up method.



C) accounting method.



#### Explanation

The method used by Costa is known as the pure-play method. The method entails selection of the pure-play equity beta, unlevering it using the pure-play company's capital structure, and re-levering using the subject company's capital structure.

(Study Session 10, Module 35.2, LOS 35.i)

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### Question #86 of 88

A firm is considering a \$5,000 project that will generate an annual cash flow of \$1,000 for the next 8 years. The firm has the following financial data:

- Debt/equity ratio is 50%.
- Cost of equity capital is 15%.
- Cost of new debt is 9%.
- Tax rate is 33%.

Determine the project's net present value (NPV) and whether or not to accept it.

	<u>NPV</u>	<u>Accept / Reject</u>
A)	+\$4,968	Accept
B)	+\$33	Accept
C)	-\$33	Reject



#### Explanation

First, calculate the weights for debt and equity

$$w_d + w_e = 1$$

$$w_d = 0.50w_e$$

$$0.5w_e + w_e = 1$$

$$w_d = 0.333, w_e = 0.667$$

Second, calculate WACC

$$\text{WACC} = (w_d \times k_d) \times (1 - t) + (w_e \times k_e) = (0.333 \times 0.09 \times 0.67) + (0.667 \times 0.15) = 0.020 + 0.100 = 0.120$$

Third, calculate the PV of the project cash flows

$$N = 8, \text{PMT} = -1,000, \text{FV} = 0, \text{I/Y} = 12, \text{CPT PV} = 4,967$$

And finally, calculate the project NPV by subtracting out the initial cash flow

$$\text{NPV} = \$4,967 - \$5,000 = -\$33$$

(Study Session 10, Module 35.1, LOS 35.a)

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### Question #87 of 88

A firm has \$3 million in outstanding 10-year bonds, with a fixed rate of 8% (assume annual payments). The bonds trade at a price of \$92 per \$100 par in the open market. The firm's marginal tax rate is 35%. What is the after-tax component cost of debt to be used in the weighted average cost of capital (WACC) calculations?

A) 9.26%.



B) 6.02%.



C) 5.40%.



#### Explanation

If the bonds are trading at \$92 per \$100 par, the required yield is 9.26% ( $N = 10$ ;  $PV = -92$ ;  $FV = 100$ ;  $\text{PMT} = 8$ ;  $\text{CPT I/Y} = 9.26$ ). The equivalent after-tax cost of this financing is:  $9.26\% (1 - 0.35) = 6.02\%$ .

(Study Session 10, Module 35.1, LOS 35.h)

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### Question #88 of 88

Utilitarian Co. is looking to expand its appliances division. It currently has a beta of 0.9, a D/E ratio of 2.5, a marginal tax rate of 30%, and its debt is currently yielding 7%. JF Black, Inc. is a publicly traded appliance firm with a beta of 0.7, a D/E ratio of 3, a marginal tax rate of 40%, and its debt is currently yielding 6.8%. The risk-free rate is currently 5% and the expected return on the market portfolio is 9%. Using this data, calculate Utilitarian's weighted average cost of capital for this potential expansion.

A) 7.1%.



B) 5.7%.



C) 4.2%.



#### Explanation

$$\beta_{\text{JF Black asset}} = 0.7 \left[ \frac{1}{1 + (1 - 0.40)3.0} \right] = 0.25$$

$$\beta_{\text{Utilitarian project}} = 0.25 [1 + (1 - 0.3)(2.5)] = 0.6875$$

$$\text{project cost of equity} = 5\% + 0.6875(9\% - 5\%) = 7.75\%$$

$$\text{WACC}_{\text{project}} = \frac{1}{3.5}(7.75) + \frac{2.5}{3.5}(7\%)(1 - 0.3) = 5.71\%$$

(Study Session 10, Module 35.2, LOS 35.i)