

2013 Level II Mock Exam: Morning Session

The morning session of the 2013 Level II Chartered Financial Analyst (CFA®) Mock Examination has 60 questions. To best simulate the exam day experience, candidates are advised to allocate an average of 18 minutes per item set (vignette and 6 multiple choice questions) for a total of 180 minutes (3 hours) for this session of the exam.

Questions	Topic
1–6	Ethical and Professional Standards
7-12	Derivatives
13-18	Fixed-Income Investments
19-24	Portfolio Management
25-30	Alternative Investments
31-36	Quantitative Methods
37-48	Financial Reporting & Analysis
49-54	Corporate Finance
55-60	Equity Investments
Total:	180

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Questions 1 to 6 relate to Ethical and Professional Standards

Tea Industry Case Scenario

Christian Mathew, CFA, is an equity analyst specializing in the beverage industry, for Gupta Asset Managers (Gupta), a portfolio management company based in Mumbai, India. Mathew is planning a trip to Sri Lanka to research the tea industry. Murali Premadosa, CFA, known as “Prem,” is a research analyst for a stock broking company, Ashoka Brokers, headquartered in Colombo, Sri Lanka. Mathew contacts Prem to help arrange visits to specifically identified tea estates of publicly traded companies in the highlands of Sri Lanka.

Prem, wanting to enhance the business relationship with Gupta, arranges for all of Mathew’s Sri Lankan expenses to be paid for by Ashoka. These costs include food, hotel and transport. This arrangement is based on the understanding that all security transactions resulting from Mathew’s trip to Sri Lanka will be executed through Ashoka. Ashoka’s commissions are typically similar to its competitors but it can take a few extra days to execute larger volumes of trades because Ashoka is new to the brokerage business. Prem sets the itinerary, with plans to visit a minimum of six Sri Lanka tea companies in the three tea-growing regions. Mathew agrees to the visits and asks Prem to create a list of questions to ask the management of each company to which he will add his own questions.

Mathew asks Prem to delay the release of any research report he writes on the six Sri Lanka companies they visit together until such time that Gupta has had an opportunity to act on Mathew’s recommendations. Prem agrees to this arrangement.

In a meeting with a publicly listed tea company, Kandy Tea Estate Limited, information is revealed that neither Mathew nor Prem believe is in the public arena. The information relates to the restructuring of the factory layout to make the tea drying process marginally more efficient with a 1% reduced loss of tealeaf. The new layout does not require any additional machinery or personnel. Prem and Mathew see the increased efficiencies during their factory tour.

After the meeting, Prem prepares an investment research report with the excerpt shown in Exhibit 1.

Exhibit 1

Kandy Tea Estate Limited

Date: December 2012

Analyst: Murali Premadosa

Chartered Financial Analyst

Recommendation: Long-term buy with associated high commodity risk supported by large growth prospects for Sri Lanka as well as liquidity risk because it is a thinly traded company in a frontier market.

Exhibit 1 cont’d - Tea Production by Country				
(million kg)	2008	2009	2010	CAGR (2008 – 2010)
India	980.8	979.0E	966.4E	–0.7%
Sri Lanka	318.7	290.6	331.4	2.9%

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Source: India Tea Board and Sri Lanka Tea Board

Mathew is impressed with Prem's work ethic and research abilities. Knowing Gupta wants to hire analysts for its new Colombo office, Mathew asks Prem if he would be interested in changing employers and building a research team. Prem is excited about the prospect and to show his worth to Gupta, Prem undertakes the following actions at his office after normal working hours:

- Action 1: Creates a list of all the work he completed at Ashoka on his personal laptop.
- Action 2: Photocopies research reports he recently completed on the tea industry.
- Action 3: Makes hand written excerpts from previous research meeting notes.

Upon Mathew's return to Mumbai, he delivers to his clients his investment report with a "Buy" recommendation for Kandy Tea Estate Limited, along with tea samples he collected while in Sri Lanka. When buying Kandy shares for his clients, Mathew also buys the same shares for his personal account. He had disclosed his plan to purchase the shares for his own portfolio alongside his clients before he bought the shares. However, Mathew is forced to sell the same shares two weeks later to pay for a medical emergency. Mathew received permission from Gupta's compliance officer for both transactions.

1. Is Prem's arrangement to enhance business relations consistent with the CFA Institute Code of Ethics and Standards of Professional Conduct?
 - A. Yes
 - B. No, with regard to best execution
 - C. No, with regard to independence and objectivity

Answer = B

"Guidance for Standards I–VII," CFA Institute
2013 Modular Level II, Vol. 1, Reading 2, Standard I (B) Independence and Objectivity, Standard III (A) Soft Commission Policies.
Study Session 1–2–a
Demonstrate a thorough knowledge of the Code of Ethics and Standards of Professional Conduct by applying the Code and Standards to specific situations.

B is correct because Prem's employer, Ashoka is not able to provide best execution for Gupta's customers because of the longer timeframe required to execute trades. Thus Mathew is in violation of Standard III (A) – Duties to Clients. Mathew's independence and objectivity are unlikely to be compromised by Prem's arranging the itinerary because Mathew had specifically identified the companies he wanted to visit. Mathew also added questions to Prem's list of questions to be addressed with management during their interviews, so Mathew's independence and objectivity would not likely be compromised. Ashoka's offer to pay for the trip expenses also does not necessarily compromise Mathew's independence and objectivity with regard to making investment recommendations or taking investment action (Standard I (B) Independence and Objectivity). Also of

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note, there doesn't appear to be any evidence that soft dollar commissions were not being used for the benefit of Gupta clients because the research trip is for their benefit.

2. Who is *most likely* to have violated CFA Institute Standards in regard to the timing of the release of research reports?
- A. Prem
 - B. Mathew
 - C. Both Prem and Mathew

Answer = C

"Guidance for Standards I–VII", CFA Institute

2013 Modular Level II, Vol. 1, Reading 2, Standard I (A) Relationship between the Code and Standards and Applicable Law, Standard III (B) Fair Dealing.

Study Session 1–2–a

Demonstrate a thorough knowledge of the Code of Ethics and Standards of Professional Conduct by applying the Code and Standards to specific situations.

C is correct because by agreeing to Mathew's stipulation, Prem is in violation of Standard III (B). Standard III (B) obliges CFA Institute members and candidates to ensure that information is disseminated in such a manner that all clients have a fair opportunity to act on every recommendation. Prem let Mathew's clients trade on information garnered on the research trip before Prem even disseminates this information to his clients, a violation of Standard III (B). In addition, Standard I (A) states that members and candidates are responsible for violations in which they knowingly participate or assist. By making a stipulation regarding the release of investment recommendations unfairly to all Ashoka clients, Mathew is knowingly participating with or assisting Prem in violating Standard III (B) and thus violates Standard I (A). Therefore, both Prem and Mathew have violated CFA Institute Standards.

3. Is any further action *most likely* required of Prem and Mathew prior to publishing an investment report using the information received in their meeting with Kandy Tea Estate?
- A. No.
 - B. Yes, convince the company to make a public disclosure.
 - C. Yes, independently verify the information provided by the company.

Answer = A

"Guidance for Standards I–VII," CFA Institute

2013 Modular Level II, Vol. 1, Reading 2, Standard II (A) Material Nonpublic Information.

Study Session 1–2–b

Recommend practices and procedures designed to prevent violations of the Code of Ethics and Standards of Professional Conduct.

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A is correct because while the information is non-public, it is unlikely that news of a new factory layout would be considered “material,” especially in that it does not require new machinery or personnel. Therefore, no public disclosure is required. Independent verification is not necessarily required because Prem and Mathew are able to see the increased efficiencies during their factory tour.

4. Prem’s research report in Exhibit 1 *least likely* violates which CFA Institute Standard?

- A. Plagiarism
- B. Use of CFA designation
- C. Communication with Clients

“Guidance for Standards I–VII,” CFA Institute

2013 Modular Level II, Vol. 1, Reading 2, Standard II (C) Plagiarism, Standard V (B) Communication with Clients and Prospective Clients, Standard VII (B) Proper Usage of the CFA Marks.

Study Session 1–2–a

Demonstrate a thorough knowledge of the Code of Ethics and Standards of Professional Conduct by applying the Code and Standards to specific situations.

Answer = A

A is correct because the statistics cited are referenced as being from the India Tea Board and the Sri Lanka Tea Board. Thus, Prem is not trying to pass the information off as his own. However, he has violated Standard VII (B) with regard to the use of the CFA designation. Prem is not allowed to use his designation as a title or noun– that is, “Chartered Financial Analyst.” The Chartered Financial Analyst and CFA marks must always be used either after a charterholder’s name or as adjectives (never as nouns) in written documents. For example, to refer to oneself as a “CFA” or a “Chartered Financial Analyst” is improper. The correct usage would be John Jones, Chartered Financial Analyst, or Jane Smith, CFA. Prem also violated Standard IV (B) Communication with Clients by citing dated tea production information. As a result, clients are unlikely to be able to follow the reasoning behind his recommendation.

5. Which of the actions that Prem undertakes to show his value to Gupta is consistent with the CFA Institute Standards?

- A. Action 1
- B. Action 2
- C. Action 3

Answer = A

“Guidance for Standards I–VII,” CFA Institute

2013 Modular Level II, Vol. 1, Reading 2, Standard V (C) Record Retention.

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Study Session 1–2–a

Demonstrate a thorough knowledge of the Code of Ethics and Standards of Professional Conduct by applying the Code and Standards to specific situations.

A is correct because a list of the reports Prem has created is not considered research so he has not violated Standard IV – Duty to Employers or Standard V (C). Also, he created the list after working hours and used his personal laptop, so he has not used company resources to create this list.

6. Mathew’s investment actions upon his return to Mumbai violate CFA Institute Standards with regards to his:
- A. disclosure to clients.
 - B. personal tea investments.
 - C. gifts of tea samples to clients.

Answer = B

“Guidance for Standards I–VII,” CFA Institute

2013 Modular Level II, Vol. 1, Reading 2, Standard I (B) Independence and Objectivity, Standard VI (A) Disclosure of Conflicts, Standard VI (B) Priority of Transactions.

Study Session 1–2–a

Demonstrate a thorough knowledge of the Code of Ethics and Standards of Professional Conduct by applying the Code and Standards to specific situations.

B is correct because Mathew has violated CFA Standard VI (B) Priority of Transaction. Mathew buying thinly traded shares in a frontier market for his personal account at the same time as he is buying them for his clients is likely to harm his clients because the share prices would rise before all the shares are purchased. However, gifts of tea samples to Mathew’s clients are insignificant and unlikely to contribute to their decisions to implement Mathew’s investment recommendation. Consequently, he has not violated Standard I (B) Independence and Objectivity. He also made appropriate prior disclosures to his clients about his tea investment, so he is not in violation of Standard VI (A) Disclosure of Conflicts.

Questions 7 to 12 relate to Derivatives

Ryan Parisi Case Scenario

Ryan Parisi is a managing director in the derivatives group at High Ridge Partners, an investment management firm. Parisi specializes in advising institutional clients on the use of forward contracts in their portfolio management strategies. Parisi is preparing to meet with three of the firm’s U.S. – based clients: Leslie Sheroda, Kihoon Kwon, and David Ruane. Corey Curmaci, an analyst in the derivatives group, has also been asked to attend the meeting. Prior to the meeting, Parisi asks Curmaci if he is clear about how the value

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of a forward contract is determined. Curmaci responds, “Yes, I am. In general, the value of a forward contract may be positive or negative at the inception of the contract, during its life, and at the expiration of the contract.”

Leslie Sheroda manages equity portfolios for a pension fund. One month (30 days) ago, Sheroda had indicated that the pension fund expected a large inflow of cash in 60 days. In order to hedge against a potential rise in equity values over this period, Parisi advised Sheroda to enter into a long forward contract on the S&P 500 Index expiring in 60 days. Sheroda has asked Parisi to calculate the value of the forward position today – that is, 30 days after the contract was initiated. Parisi has collected the information in Exhibit 1 to carry out the valuation assignment.

Exhibit 1
Selected Financial Information for Sheroda Meeting

Price of a 60-day S&P 500 forward contract 30 days ago	1403.22
S&P 500 Index level today	1450.82
Annualized continuously compounded risk-free rate	3.92%
Annualized continuously compounded dividend yield for S&P 500	2.50%

Three months ago (90 days), Kwon purchased a bond with a 5% annual coupon rate and a maturity of 7 years from the date of purchase. The bond has a face value of USD1,000 and pays interest every 180 days from the date of issue. Kwon is concerned about a potential increase in interest rates over the next year and has approached Parisi for advice on how he can use forward contracts to manage his risk. Parisi advises Kwon to enter into a short forward contract expiring in 360 days. The annualized risk-free rate now is 4% per year, and the price of the bond with accrued interest is USD1,071.33. Kwon asks Parisi to calculate the appropriate price for the forward contract.

Kwon asks Parisi, “Will there be any credit risk associated with this forward position?”

Parisi responds with the following statement:

“You will not be exposed to credit risk at the inception of the contract or at expiration after the contract is marked to market and settled. Between dates when the contract is marked to market, you face credit risk if the price of the forward contract rises above the price at the inception of the contract.”

Parisi’s next meeting is with Ruane, who is the corporate treasurer for a manufacturing firm. For the meeting, Parisi has collected the information in Exhibit 2.

Exhibit 2
Selected Financial Information for Ruane Meeting

Annualized 90-day LIBOR rate	3.2%
Annualized 450-day LIBOR rate	4.5%
Annualized risk-free rate in the U.S.	4.0%
Annualized risk-free rate in the euro zone.	6.0%
Spot exchange rate, USD per EUR	1.3900

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Three months (90 days) from now Ruane expects to borrow USD 5 million, at LIBOR, for a period of twelve months (360 days). He is concerned that interest rates may rise significantly over the next few months and wishes to hedge this risk. Parisi advises Ruane to enter into a forward rate agreement (FRA) expiring in 90 days on 360-day LIBOR. Ruane wants to know the rate he would receive on the FRA.

Ruane also expects an inflow of EUR3 million that needs to be converted to USD in 270 days and is concerned that the euro will decline in value over this period. Ruane is advised by Parisi to enter into an agreement to sell the euro forward in 270 days. Ruane asks Parisi to determine the appropriate forward price on the euro.

7. In his response to Parisi, Curmaci is *least likely* correct with respect to the value of a forward contract:
- A. at inception.
 - B. at expiration.
 - C. during the life of the contract.

Answer = A

“Futures Markets and Contracts,” Don M. Chance, CFA
2013 Modular Level II, Vol. 6, Reading 48, Section 4.1
Study Session 16–48–a

Explain how the value of a forward contract is determined at initiation, during the life of the contract, and at expiration.

A is correct. It is customary in the forward market for the initial value to be set to zero. This convention eliminates the necessity of either party making a payment to the other and results in a simple determination of the forward price. Specifically, setting $V_0(0, T) = 0$ and letting r represent the interest rate,

$$V_0(0, T) = S_0 - \frac{F(0, T)}{(1+r)} = 0$$

which means that $F(0, T) = S_0(1 + r)$.

8. Based on the information in Exhibit 1 and assuming a 360-day year, the value of Sheroda’s forward contract is *closest to*:
- A. USD 49.16.
 - B. USD 50.71.
 - C. USD 52.18.

Answer = A

“Forward Markets and Contracts,” Don M. Chance, CFA

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2013 Modular Level II, Vol. 6, Reading 48, Section 4.2

Study Session 16–48–b

Calculate and interpret the price and the value of an equity forward contract, assuming dividends are paid either discretely or continuously.

A is correct. $V_{30}(0,60) = (1450.82e^{-0.025(30/360)}) - (1403.22e^{-0.0392(30/360)}) = \$1,447.80 - \$1,398.64 = \49.16 .

9. Based on a 360-day year, the price of the forward contract on the bond purchased by Kwon is *closest to*:

- A. \$1,042.55.
- B. \$1,063.19.
- C. \$1,114.18.

Answer = B

“Forward Markets and Contracts,” Don M. Chance, CFA

2013 Modular Level II, Vol. 6, Reading 48, Section 4.3

Study Session 16–48–c

Calculate and interpret the price and the value of 1) a forward contract on a fixed-income security, 2) a forward rate agreement (FRA), and 3) a forward contract on a currency.

B is correct. $PV \text{ of coupons} = 25/(1.04)^{90/360} + 25/(1.04)^{270/360} = 24.7561 + 24.2753 = \49.03 .
 $F(0,360) = (1071.33 - 49.03)(1.04)^{360/360} = \$1,063.19$.

10. In his response to Kwon, Parisi is *least likely* correct with respect to credit risk:

- A. at contract expiration.
- B. when the contract is initiated.
- C. between marked-to-market dates.

Answer = C

“Futures Markets and Contracts,” Don M. Chance, CFA

2013 Modular Level II, Vol. 6, Reading 48, Section 5

Study Session 16–48–d

Evaluate credit risk in a forward contract, and explain how market value is a measure of exposure to a party in a forward contract.

C is correct. Parisi is incorrect. Kwon has entered into a short forward contract. If the price of the contract rises above the price of the contract at inception between dates when the contract is marked to the market, it is Kwon’s counterparty that is exposed to credit risk, not Kwon. Kwon is exposed to credit risk if the price of the contract falls below the price of the contract at inception.

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11. The rate that Ruane would get on the FRA expiring in 90 days on 360– day LIBOR is *closest* to:

- A. 1.26%.
- B. 3.83%.
- C. 4.79%.

Answer = C

“Forward Markets and Contracts,” Don M. Chance, CFA

2013 Modular Level II, Vol. 6, Reading 48, Section 4.3

Study Session 16–48–c

Calculate and interpret the price and the value of 1) a forward contract on a fixed-income security, 2) a forward rate agreement (FRA), and 3) a forward contract on a currency.

C is correct.

The FRA is given by the following formula:
$$\text{FRA}(0,90,360) = \left[\frac{1 + 0.045\left(\frac{450}{360}\right)}{1 + 0.032\left(\frac{90}{360}\right)} - 1 \right] \left(\frac{360}{360} \right) = 0.0479$$

12. The forward price at which Ruane should be able to sell euros is *closest* to:

- A. USD1.3306/EUR.
- B. USD1.3703/EUR.
- C. USD1.4167/EUR.

Answer = B

“Forward Markets and Contracts,” Don M. Chance, CFA

2013 Modular Level II, Vol. 6, Reading 48, Section 4.4

Study Session 16–48–c

Calculate and interpret the price and the value of 1) a forward contract on a fixed-income security, 2) a forward rate agreement (FRA), and 3) a forward contract on a currency;

B is correct.

$$F(0,T) = \left(\frac{1.3900}{(1.06)^{270/360}} \right) (1.04)^{270/360} = \text{USD1.3703/EUR}$$

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Questions 13 to 18 relate to Fixed-Income Investments

Katharina Richter Case Scenario

Katharina Richter, CFA, is a fixed-income analyst at Paar Advisors, an investment advisory firm. She is evaluating a set of mortgage-backed securities (MBS) so that she can make recommendations about those securities for the firm's clients.

The securities, which are not yet issued, will be backed by a pool that currently contains \$117.54 million of U.S. 30-year residential mortgages. The pool has a weighted-average coupon (WAC) of 4.80% and a weighted-average maturity (WAM) of 243 months, which implies 17 months of seasoning. Richter reviews current prepayment estimates for this pool from three different providers. The first estimates a CPR of 8.50%, the second a prepayment speed of 220 PSA, and the third an SMM of 0.70%. As Richter reads about one provider's prepayment expectations, she finds the following statement: "Although U.S. mortgage interest rates are very low relative to the historical average, rates have been this low or lower for a number of years. Further, the general state of the economy is very poor. These factors cause us to expect low prepayment rates for the coming months." After some analysis, Richter realizes market conditions are such that these securities will not to be issued for another two months. At issue, the pool will not be replenished with new mortgage loans. She adjusts her analysis of the pool, using the SMM estimate of 0.70%, to reflect this delay.

One of Paar's clients, Konrad Hartmann, is concerned that mortgage interest rates might rise by about 1% in the near future and remain at that higher level for some period of time. He asks Richter which of the many types of CMO tranches and stripped mortgage-backed securities would perform best if his concerns are realized. Hartmann is also interested in the characteristics of MBS. He tells Richter that he understands that MBS are considered path-dependent securities for three reasons:

- Reason 1: The influence of earlier prepayments on current cash flows.
- Reason 2: The tendency of few mortgage borrowers to prepay early in the life of their mortgages.
- Reason 3: The way the current prepayment rate reflects whether borrowers have already had an opportunity to refinance at the current mortgage rate.

Hartmann shows Richter some spread information he has received regarding three CMO tranches. This information is found in Exhibit 1. He tells Richter he would be happy to invest in any of these securities based on their other characteristics and asks which he should choose based solely on this information.

Exhibit 1
Spread Comparison

	Nominal Spread	Zero Volatility Spread	Option- Adjusted Spread
Security X	2.12%	1.67%	0.00%

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Security Y	3.18%	1.30%	−0.27%
Security Z	1.84%	1.46%	0.67%

13. Of the three prepayment estimates Richter reviews, the highest is *most likely* the one presented in terms of:

- A. PSA.
- B. CPR.
- C. SMM.

Answer = B

“Mortgage-Backed Sector of the Bond Market,” Frank J. Fabozzi, CFA
2013 Modular Level II, Vol. 5, Reading 45, Section 3 D
Study Session 15–45–c, d

Calculate the prepayment amount for a month, given the single monthly mortality rate.
Compare the conditional prepayment rate (CPR) with the Public Securities Association (PSA) prepayment benchmark.

B is correct because the prepayment estimate provided in SMM is 0.70%. For the one presented in CPR, $SMM = 1 - (1 - CPR)^{1/12}$, so a CPR of 8.50% implies that $SMM = 1 - (1 - 0.085)^{1/12} = 0.0074 = 0.74\%$. The pool has 17 months of seasoning, so 220 PSA implies $CPR = 17 \times 0.2\% \times 2.20 = 7.48\%$, which implies that $SMM = 1 - (1 - 0.0748)^{1/12} = 0.65\%$. The highest prepayment estimate of the three is the estimate of CPR = 8.50%.

14. The statement Richter reads about prepayment expectations is *most likely*:

- A. correct.
- B. incorrect with regard to the impact of current mortgage rates.
- C. incorrect with regard to the impact of current economic conditions.

Answer = A

“Mortgage-Backed Sector of the Bond Market,” Frank J. Fabozzi, CFA
2013 Modular Level II, Vol. 5, Reading 45, Section 3 F
Study Session 15–45–f

Explain factors that affect prepayments and the types of prepayment risks.

A is correct because although mortgage rates are low, which would normally imply high rates of prepayment, they have been low for some time. Therefore, any higher-rate mortgage borrowers have already had the opportunity to refinance at the current low (or even lower) rates. Newer

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borrowers borrowed at these low (or lower) rates, so they will not have a refinancing incentive. This “burnout” effect means that the current low mortgage rates are not expected to produce high rates of prepayment, as stated. Further, a poor economy will result in lower housing turnover, which will reduce the rate of prepayment that would be caused by people moving to new houses.

15. The expected balance of the mortgage pool Richter is analyzing on the revised date of issue is *closest to*:
- A. \$115,329,054.
 - B. \$115,333,047.
 - C. \$115,894,440.

Answer = B

“Mortgage-Backed Sector of the Bond Market,” Frank J. Fabozzi, CFA

2013 Modular Level II, Vol. 5, Reading 45, Section 3 D

Study Session 15–45–b, c

Explain investment characteristics, payment characteristics, and risks of mortgage pass-through securities.

Calculate the prepayment amount for a month, given the single monthly mortality rate.

B is correct because based on the beginning balance of \$117.54 million, WAC of 4.80%, WAM of 243 months, and SMM of 0.70%, the expected cash flows of the pool for the next two months are as follows:

Month	P&I	Interest	Principal	Prepayment	Balance
0					117,540,000
1	757,174	470,160	287,014	820,771	116,432,215
2	751,874	465,729	286,145	813,022	115,333,047

where for Month 1 (Month 2), the P&I payment is the level (annuity) payment for a principal balance of 117,540,000 (116,432,215) paid over 243 (242) months at a monthly rate of 0.40% (4.80%/12), the interest payment is 0.40% of the previous month’s principal balance, the scheduled principal payment is the difference between the P&I and interest payment, the expected prepayment is 0.70% of the previous month’s principal balance less the scheduled principal payment, and the ending principal balance is the previous month’s principal balance less the schedule principal payment less the expected prepayment.

16. Which of these security types is Richter *most likely* to suggest for Hartmann?
- A. A PAC tranche
 - B. A support tranche
 - C. A principal-only strip

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Answer = A

“Mortgage-Backed Sector of the Bond Market,” Frank J. Fabozzi, CFA

2013 Modular Level II, Vol. 5, Reading 45, Section 4 E

Study Session 15–45–i, j

Evaluate the risk characteristics and relative performance of each type of CMO tranche, given changes in the interest rate environment.

Explain investment characteristics of stripped mortgage-backed securities.

A is correct because if interest rates rise moderately, prepayment rates will decline moderately. The PAC tranche will still be within its effective prepayment collar, so its cash flows will remain as promised or planned. The tranche’s value will be reduced only by the increase in the discount rate.

17. Which of Hartmann’s reasons as to why MBS are path-dependent securities is *least likely* correct?

- A. Reason 1
- B. Reason 2
- C. Reason 3

Answer = B

“Valuing Mortgage-Backed and Asset-Backed Securities,” Frank J. Fabozzi, CFA

2013 Modular Level II, Vol. 5, Reading 47, Section 4

Study Session 15–47–c

Describe path dependency in pass-through securities and the implications for valuation models.

B is correct because the reason described is related to seasoning, which is a characteristic of mortgage pools but not a cause of path dependency.

18. Based on the information in Exhibit 1, Hartmann should *most likely* invest in:

- A. Security X.
- B. Security Y.
- C. Security Z.

Answer = C

“Valuing Mortgage-Backed and Asset-Backed Securities,” Frank J. Fabozzi, CFA

2013 Modular Level II, Vol. 5, Reading 47, Section 4 E

Study Session 15–47–e

Evaluate a mortgage-backed security using option-adjusted spread analysis.

C is correct because Security Z has the highest option-adjusted spread (OAS). The OAS is the spread measure that takes into account the cost of the prepayment option embedded in mortgage-backed

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securities. A higher OAS implies a higher expected return after accounting for the negative value of the prepayment option. The nominal spread and zero volatility spread do not take into account the cost of the embedded prepayment option.

Questions 19 to 24 relate to Portfolio Management

Vikram Shah Case Scenario

Vikram Shah works as a portfolio manager for Heddon Investment Advisors. Shah is meeting with the Investment Committee of a corporate pension fund to discuss portfolio performance, and strategies and techniques used in the management of the pension fund. For the meeting, Shah has collected the information in Exhibit 1.

Exhibit 1
Selected Financial Information

	Large-Cap U.S. Stocks	Investment Grade U.S. Corporate Bonds	Emerging Market Stocks
Expected Annual Return (%)	11	8	16
Expected Standard Deviation of Annual Returns (%)	14	6	22
Return Correlations			
Large-Cap U.S. Stocks	1.0	0.3	0.4
Investment-Grade U.S. Corporate Bonds	---	1.0	-0.1
Emerging Market Stocks	---	---	1.0

Shah explains that his firm uses mean–variance portfolio analysis to guide asset allocation. He states, “We use mathematical techniques to identify a set of efficient portfolios. From this set, we select a portfolio that best matches our risk preferences. The pension fund’s assets are currently invested in the following proportions: 60% U.S. large-cap stocks, 35% U.S. investment-grade corporate bonds, and 5% emerging market stocks. Our analysis suggests that we should modify our current allocations so that the new allocations are 55% U.S. large-cap stocks, 30% U.S. investment–grade corporate bonds, and 15% emerging market stocks. This reallocation will result in a mean–variance efficient portfolio that is better aligned with our risk preferences.”

Jerry Cramer, a member of the investment committee, wants to know how correlations between securities and the number of securities in the portfolio impact the pension portfolio’s diversification benefits.

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Shah responds, “As the average correlation between securities in a portfolio increases, the risk reduction benefits of diversification decrease. Furthermore, as average correlation between securities in a portfolio rises, the number of securities in the portfolio must be increased in order to achieve the same percentage of portfolio risk reduction when the average correlation between securities is lower.”

Another board member, Kala Amato, notes that no part of the pension portfolio is invested in a risk-free asset. She wants to know the impact of combining the current portfolio with an investment in a risk-free asset.

In response Shah states, “If we combine our portfolio with an investment in a risk-free asset, the result will be a new linear efficient frontier that is referred to as the capital allocation line (CAL) or the capital market line (CML). The risk and return of the resulting new portfolio will be linear combinations of the risk and return of the risk-free investment and our portfolio.”

Cramer asks Shah, “Can you explain the model that you use to select stocks for inclusion in the equity portion of the pension portfolio?”

Shah responds, “At Heddon, the primary model we use is a multi-factor model where the factors are: price-to-earnings ratio, financial leverage, and market capitalization.”

Shah moves on to a discussion on how Heddon Investment Advisors assesses portfolio risk. He states, “We use a risk model to decompose active risk into the following two components:

Component 1

This component is referred to as “active factor risk.” This is systematic risk attributable to differences in factor exposures between the portfolio and the benchmark. Note that the factors in our model are: price-to-earnings ratio, financial leverage, and market capitalization.

Component 2

The second component is a function of the individual asset’s active weight in the portfolio and the variance of returns unexplained by our three factors. This component is the active specific risk or asset selection risk.”

Shah continues, “We prefer to structure our portfolio such that in addition to being on the efficient frontier, it tilts, relative to the benchmark, toward stocks of large-capitalization companies with lower P/E ratios and lower levels of leverage. Exhibit 2 shows the factor sensitivities for the recommended portfolio and the benchmark.”

Exhibit 2
Factor Sensitivity

Factor	Portfolio	Benchmark
P/E Ratio	–0.25	–0.35
Financial Leverage	–0.60	–0.40
Market Capitalization	0.50	0.35

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19. Based on the information presented in Exhibit 1, the standard deviation of Shah's new portfolio is *closest* to:

- A. 6.34%.
- B. 10.04%.
- C. 12.80%.

Answer = B

"Portfolio Concepts," Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 2.2

Study Session 18–54–a

Explain mean–variance analysis and its assumptions, and calculate the expected return and the standard deviation of return for a portfolio of two or three assets.

B is correct.

$$\sigma_p = \left(w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + w_3^2 \sigma_3^2 + 2w_1 w_2 \rho_{1,2} \sigma_1 \sigma_2 + 2w_1 w_3 \rho_{1,3} \sigma_1 \sigma_3 + 2w_2 w_3 \rho_{2,3} \sigma_2 \sigma_3 \right)^{0.5}.$$

10.04 =

$$\left((0.55^2)(14^2) + (0.3^2)(6^2) + (0.15^2)(22^2) + 2(0.55)(0.3)(0.3)(14)(6) + 2(0.55)(0.15)(0.4)(14)(22) + 2(0.3)(0.15)(-0.1)(6)(22) \right)^{0.5}.$$

20. Is Shah's response to Cramer's question about the impact of correlation on portfolio risk diversification benefits and the number of securities required to achieve a certain level of risk diversification *most likely* correct?

- A. Yes.
- B. No, he is incorrect about the impact of average correlation on risk diversification.
- C. No, he is incorrect about average correlation and the number of securities required to achieve a certain level of portfolio risk diversification.

Answer = C

"Portfolio Concepts," Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 2.4

Study Session 18–54–c

Explain the benefits of diversification and how the correlation in a two-asset portfolio and the number of assets in a multi-asset portfolio affect the diversification benefits.

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C is correct. Shah is incorrect about average correlation and the number of securities required to achieve a particular level of portfolio risk reduction. As the correlation between securities increases, the number of securities required to achieve a particular level of portfolio risk decreases. Portfolio risk is:

$$\sigma_p^2 = \sigma^2 \left[\frac{1-\rho}{n} \right] + \rho.$$

For example, take a situation where the average correlation is 0.3. In this situation, the minimum possible portfolio variance, when n is very large, is $0.3\sigma^2$ —that is, 0.3 times the variance of a single stock. In order to achieve a portfolio with only 110% of this minimum possible portfolio variance we would need 25 stocks.

$$\sigma_p^2 = \sigma^2 \left[\frac{1-0.3}{25} \right] + 0.3 = 0.33\sigma^2.$$

If the average correlation is 0.5, it can be shown that only 10 stocks are needed to achieve a portfolio that is 110% of the minimum possible portfolio variance of $0.5\sigma^2$.

$$\sigma_p^2 = \sigma^2 \left[\frac{1-0.5}{10} \right] + 0.5 = 0.55\sigma^2.$$

That is, you need 25 stocks to achieve a risk level of 110% of the minimum possible portfolio risk when the correlation is 0.3. You need 10 stocks to achieve a risk level of 110% of the minimum possible portfolio risk when the correlation is 0.5.

21. In his response to Amato, Shah is *most likely* correct with respect to the:

- A. CAL and the CML.
- B. new efficient frontier.
- C. risk and return of the new portfolio.

Answer = C

“Portfolio Concepts,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 2.5

Study Session 18–54–d

Calculate the variance of an equally weighted portfolio of n stocks, explain the capital allocation and capital market lines (CAL and CML) and the relation between them, and calculate the value of one of the variables given values of the remaining variables.

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C is correct. Shah is correct that the risk and return of the new portfolio will be linear combinations of the risk and return of the risk-free investment and the portfolio, respectively. This is because the return and risk of the new portfolio is calculated as:

$$E(R_p) = w_1 \times E(R_1) + (1 - w_1) \times E(R_2)$$

$$SD(R_p) = w_1 \times SD(R_1)$$

22. Shah's response to Cramer's question regarding the model used by Heddon Investment Advisors, would imply that the multifactor model is *most likely* a:

- A. statistical factor model.
- B. fundamental factor model.
- C. macroeconomic factor model.

Answer = B

"Portfolio Concepts," Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 4.1

Study Session 18–54–j

Describe and compare macroeconomic factor models, fundamental factor models, and statistical factor models.

B is correct. The multi-factor model that Shah describes is a fundamental factor model. In fundamental factor models, the factors are attributes of stocks or companies that are important in explaining cross-sectional differences in stock prices. Among the fundamental factors that have been used are the book-value-to-price ratio, market capitalization, the price-to-earnings ratio, and financial leverage.

23. Is Shah correct about the components of active risk?

- A. Yes.
- B. No, he is incorrect about Component 1.
- C. No, he is incorrect about Component 2.

Answer = A

"Portfolio Concepts," Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 4.6.2

Study Session 18–54–m

Explain the sources of active risk, interpret tracking error, tracking risk, and the information ratio, and explain factor portfolio and tracking portfolio.

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A is correct. Shah correctly describes the two components of active risk. We can separate a portfolio's active risk squared into two components: 1) Active factor risk is the contribution to active risk squared resulting from the portfolio's different-from-benchmark exposures relative to factors specified in the risk model (or systematic risk), and 2) active specific risk— or asset selection risk— is the contribution to active risk squared resulting from the portfolio's active weights on individual assets as those weights interact with assets' residual risk (also referred to as idiosyncratic risk).

24. With respect to the factor tilts of the portfolio in Exhibit 2, Shah is *least likely* correct about:

- A. P/E ratio.
- B. financial leverage.
- C. market capitalization.

Answer = A

"Portfolio Concepts," Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 6, Reading 54, Section 4.6

Study Session 18–54–m

Explain the sources of active risk, interpret tracking error, tracking risk, and the information ratio, and explain factor portfolio and tracking portfolio.

A is correct. Shah is incorrect with respect to price to earnings. He states that his firm ensures that the portfolio is tilted toward low P/E stocks. The factor sensitivity of the portfolio to the P/E factor is negative (-0.25) indicating that it does invest in low P/E stock. However, the benchmark's sensitivity is -0.35 , indicating that stocks in the benchmark have lower P/Es than stocks in the portfolio. Thus, the portfolio is not tilted toward low P/E stocks relative to the benchmark.

Questions 25 to 30 relate to Alternative Investments

Martin Investment Management Inc Case Scenario

Jennifer Martin, CFA, is the owner of Martin Investment Management Inc, a boutique company that specializes in managing money for high-net-worth individuals. The firm specializes in real estate and private equity investments. Martin has three client meetings today.

The first meeting is with Larry Smith. Smith is interested in a portfolio of private equity real estate as a long-term investment. Specifically, he is interested in the risk–return characteristics of private equity real estate portfolios versus those of stock portfolios. Martin advises Smith that private equity real estate portfolios are generally riskier than stock portfolios and the expected returns are lower.

Martin learns that Smith's long-term goal when he retires is to purchase a multi-family property. For example, there is one such property currently listed on the market. He plans on living in one unit and renting out the rest. The rental income would provide Smith with the cash flow that he needs in his retirement. He

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asks Martin to value the property based on the assumptions that the net operating income is \$125,000, the discount rate is 11%, and the growth rate is 6%. Martin decides to use the direct capitalization method to value the property.

Martin's second meeting is with Andre Metcalfe, who is an executive at a large national bank. Metcalfe is interested in investing in publicly traded real estate securities. In particular, he is interested in investing in securities that generate cash flow primarily from the sale of properties. Martin makes a recommendation after doing some research.

Metcalfe asks Martin about economic factors that affect the value of REITs that invest in different types of properties. Martin makes the following statements regarding key economic drivers of the value of various REITs available in the market:

Statement 1: Job creation is less of a driver of value for industrial REITs than for office and storage REITs.

Statement 2: Retail sales growth is less of a driver of value for office REITs than for industrial and storage REITs.

Statement 3: Population growth is less of a driver of value for storage REITs than for industrial and office REITs.

Martin's third meeting is with James Wolfe, who is interested in investing in venture capital or private equity funds. He is financially very comfortable and is thus willing to take on risk. Martin has recently received some information about a new venture capital deal involving a software company that may be of interest to Wolfe. Information about the software company for the venture capital deal is provided in Exhibit 1.

Exhibit 1
Venture Capital Deal – Investment Information

Terminal Value (at time of exit)	\$1,000,000
Time to Exit Event	3 years
Amount of Initial Investment	\$200,000
Discount Rate	40%

Wolfe is also interested in investing in private equity funds but is not familiar with how their management compensation systems work. He wants to make sure that management stays motivated and is focused on maximizing profits. Martin tells Wolfe that most private equity funds have a mechanism in place that enables the management team to increase its equity allocation depending on the company's actual performance and the return achieved by the private equity firm.

25. Is Martin's warning about investing in private equity real estate portfolios true?

A. Yes.

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- B. No, private equity real estate portfolios are less risky than stock portfolios and have lower expected returns.
- C. No, private equity real estate portfolios are more risky than stock portfolios and have higher expected returns.

Answer = B

“Private Real Estate Investments”, Jeffrey D. Fisher and Bryan D. MacGregor
2013 Modular Level II, Vol. 5, Reading 38, Section 4.2
Study Session 13–38–c

Explain the role in a portfolio, the major economic value determinants, investment characteristics, and principal risks of private real estate.

B is correct because private equity real estate portfolios are less risky than stock portfolios and have lower expected returns. Private equity real estate has bond-like characteristics because of the stream of lease payments and at the same time has stock-like characteristics because of the dependency on the strength of the overall economy when leases are renewed.

26. The value that Martin estimates for the multi-family property is *closest* to:

- A. \$1.14 million.
- B. \$2.08 million.
- C. \$2.50 million.

Answer = C

“Private Real Estate Investments,” Jeffrey D. Fisher and Bryan D. MacGregor
2013 Modular Level II, Vol. 5, Reading 38, Section 6.2
Study Session 13–38–g

Calculate the value of a property using the direct capitalization and discounted cash flow methods.

C is correct. $\$125,000 / (11\% - 6\%) = \2.50 million .

27. Based on Metcalfe’s goal for investing in publicly traded real estate securities, the *most* appropriate recommendation that Martin could make is to purchase a:

- A. REIT.
- B. REOC.
- C. CMBS.

Answer = B

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“Publicly Traded Real Estate Securities,” Anthony Paolone, CFA, Ian Rossa O’Reilly, CFA, and David Kruth, CFA

2013 Modular Level II, Vol. 5, Reading 39, Section 2

Study Session 13–39–a

Describe types of publicly traded real estate securities.

B is correct because real estate operating companies (REOCs) generate cash inflows primarily from the sale of developed or improved properties as opposed to recurring lease or rental income.

28. Which of Metcalfe’s statements regarding REITs is *least likely* correct?

- A. Statement 1.
- B. Statement 2.
- C. Statement 3.

Answer = C

“Publicly Traded Real Estate Securities,” Anthony Paolone, CFA, Ian Rossa O’Reilly, CFA, and David Kruth, CFA

2013 Modular Level II, Vol. 5, Reading 39, Section 3.6

Study Session 13–39–c

Explain economic value determinants, investment characteristics, principal risks, and due diligence considerations for real estate investment trust (REIT) shares.

C is correct because storage REITs are very sensitive to population growth. The greater the population, the greater the demand for storage of goods.

29. Based on the information in Exhibit 1, the pre-money valuation of the venture capital deal is *closest to*:

- A. \$164,431.
- B. \$291,545.
- C. \$364,431.

Answer = A

“Private Equity Valuation,” Yves Courtois, CFA, and Tim Jenkinson

2013 Modular Level II, Vol. 5, Reading 40, Appendix Section 1.1

Study Session 13–40–j

Calculate pre-money valuation, post-money valuation, ownership fraction, and price per share applying the venture capital method 1) with single and multiple financing rounds and 2) in terms of IRR.

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A is correct. $\$1,000,000/(1 + 0.4)^3 - \$200,000 = \$164,431$.

30. In his discussion with Wolfe on private equity funds, the mechanism Martin mentions is *most likely* a:

- A. ratchet.
- B. carried interest.
- C. distribution waterfall.

Answer = A

“Private Equity Valuation,” Yves Courtois, CFA and Tim Jenkinson
2013 Modular Level II, Vol. 5, Reading 40, Section 3.1, pp. 150-154
Study Session 13–40–f

Explain private equity fund structures, terms, valuation, and due diligence in the context of an analysis of private equity fund returns.

A is correct because a ratchet enables the management team to increase its equity allocation depending on the company’s actual performance and the return achieved by the private equity firm.

Questions 31 to 36 relate to Quantitative Methods

Brendan Dennehy Case Scenario

Brendan Dennehy works for Transon Investments, Plc., a Dublin-based hedge fund with significant equity investments in technology companies in Asia, North America, and Europe. Transon is concerned by the recent poor performance of one of the fund’s Chinese investments, Winston Communications, an assembler of telecommunications equipment. Transon’s chief of information technology (IT) is Sean Malloy. Yesterday, Winston’s IT office sent Malloy data relating to the assembly process and a printout of an analysis of the number of defective assemblies per hour. Winston’s IT people believe that the number of defective assemblies per hour is a function of the outside air temperature and the speed (production rate) of the assembly lines. Malloy recalls that Dennehy had substantial training in statistics while working on his MBA. He asks Dennehy to help him interpret the regression results supplied by Winston.

Exhibit 1

Regression Results

$$D_t = b_0 + b_1 \text{Air}_t + b_2 R_t + \varepsilon_t$$

	Coefficient	Std. Error
Constant (b_0)	0.0160	0.0942
Outside air temperature (b_1)	0.0006	0.0010
Assembly line speed (b_2)	0.5984	0.3000
Number of observations used in the regression		384
Critical t value at 5% significance (two-tail test that coefficient equals zero)		1.96

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R Square	Std. Error of the Estimate	Durbin–Watson	F	Significance of F
0.414	0.333	1.890	157.699	0.000
Durbin-Watson critical values (5% significance)		1.63	1.72	
Correlation between outside air temperature and assembly line speed		0.015		

Using the data provided in Exhibit 1, Dennehy tests the hypothesis that the coefficients for outside air temperature and assembly line speed are significantly different from zero, using a significance level of 5%. Dennehy also uses the results given in Exhibit 1 to evaluate the potential for multicollinearity in the data.

Finally, Dennehy would like to confirm that nonstationarity is not a problem. To test for this, he conducts Dickey–Fuller tests for a unit root on each of the time series. The results are reported in Exhibit 2.

Exhibit 2
Results of the Dickey–Fuller tests

Time Series	Value of the Test Statistic	Std. Error	t	Significance of t
Defective assemblies per hour	0.0036	0.0023	1.591	0.1123
Outside air temperature	–0.423	0.0724	–5.846	0.000
Assembly line speed	–0.586	0.043	–13.510	0.000

Dennehy tells Malloy about the Dickey–Fuller test results, stating:

We can safely use regression to estimate the relationship between the dependent variable and the independent variables if:

- 1) none of the three time series exhibit a unit root, or
- 2) all three series exhibit a unit root but they are also mutually cointegrated.

31. Based on Exhibit 1 and statistical tests, the *best* conclusion Dennehy can make is that the regression coefficient is significantly different from zero with respect to the coefficient (s) for:

- A. assembly line speed (b_2) only.
- B. outside air temperature (b_1) only.
- C. both outside air temperature (b_1) and assembly line speed (b_2).

Answer = A

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“Correlation and Regression,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 11, Section 3.5, Example 16

“Multiple Regression and Issues in Regression Analysis,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 12, Section 2

Study Session 3–11–e, g, 3–12–b

Explain the assumptions underlying linear regression, and interpret the regression coefficients. Formulate a null and alternative hypothesis about a population value of a regression coefficient, select the appropriate test statistic, and determine whether the null hypothesis is rejected at a given level of significance.

Formulate a null and an alternative hypothesis about the population value of a regression coefficient, calculate the value of the test statistic, determine whether to reject the null hypothesis at a given level of significance by using a one-tailed or two-tailed test, and interpret the results of the test. The null hypotheses are that the coefficients equal zero. The alternative hypotheses are that the coefficients do not equal zero (two-tailed tests). The appropriate test statistics, t , are calculated by dividing the estimates of the coefficients by their respective standard error.

$$t_{b1} = 0.0006 / 0.0010 = 0.60.$$

$$t_{b2} = 0.5984 / 0.30 = 1.9947.$$

A is correct. The test statistic for outside air temperature is less than the critical value of 1.96. The test statistic for assembly line speed exceeds the critical value of 1.96. We cannot reject the null hypothesis that the population regression coefficient for outside air temperature, b_1 , is zero. We can reject the null hypothesis that b_2 is zero at the 5% level of significance.

32. The results reported in Exhibit 1 suggest that:

- A. the F -statistic of the regression is not significant.
- B. predictions of defective assemblies per hour made using the regression have only about a 41% chance of being correct.
- C. variations in the independent variables explain approximately 41% of the variation in the defective assemblies per hour.

Answer = C

“Correlation and Regression,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 11, Section 3.6

“Multiple Regression and Issues in Regression Analysis,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 12, Sections 2.3 and 2.4

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Study Session 3–11–f, i, 3–12-g

Calculate and interpret the standard error of estimate, the coefficient of determination, and a confidence interval for a regression coefficient.

Describe the use of analysis of variance (ANOVA) in regression analysis, interpret ANOVA results, and calculate and interpret an F -statistic.

Evaluate how well a regression model explains the dependent variable by analyzing the output of the regression equation and an ANOVA table.

C is correct. The R^2 indicates variations in the independent variables which explain approximately 41% of the variation in the dependent variable. The F -statistic is highly significant. R^2 does *not* inform us regarding the probability of a dependent variable prediction being correct.

33. What is the *most* appropriate inference from the Durbin–Watson statistic reported in Exhibit 1? The Durbin–Watson test:

- A. is inconclusive.
- B. rejects the null hypothesis of no positive serial correlation.
- C. fails to reject the null hypothesis of no positive serial correlation.

Answer = C

“Multiple Regression and Issues in Regression Analysis,” Richard A. DeFusco, CFA, Dennis W.

McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 12, Section 4.2.2

Study Session 3–12–i

Explain the types of heteroskedasticity and the effects of heteroskedasticity and serial correlation on statistical inference.

C is correct. The value of the Durbin-Watson statistic is given in Exhibit 1 as 1.890. The critical values are given as 1.63 and 1.72. As the value (1.89) exceeds the upper critical value (1.72), the D-W test fails to reject the null hypothesis of no positive serial correlation. Note also that the DW statistic does not exceed 2.37, which is 4 minus the lower critical value (i.e., $4 - 1.63 = 2.37$); thus, we also fail to reject the null hypothesis of significant negative serial correlation.

34. The results reported in Exhibit 1 are *most* accurately interpreted as indicating that:

- A. the reported R^2 is spurious.
- B. multicollinearity is not present.
- C. the regression coefficients have inflated standard errors.

Answer = B

“Multiple Regression and Issues in Regression Analysis,” Richard A. DeFusco, CFA, Dennis W.

McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

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2013 Modular Level II, Vol. 1, Reading 12, Section 4.3

Study Session 3–12–j

Describe multicollinearity, and explain its causes and effects in regression analysis.

B is correct. The pairwise correlation is low. The only case in which correlation between independent variables may be a reasonable indicator of multicollinearity occurs in a regression with exactly two independent variables, as is the case in this problem. Furthermore, the additional classic symptoms of multicollinearity (high R^2 and significant F -statistic, but not significant coefficients) are not present.

35. Assuming a 5% level of significance, the *most* appropriate conclusion that can be drawn from the Dickey–Fuller results reported in Exhibit 2 is that the:

- A. test for a unit root is inconclusive for the dependent variable.
- B. dependent variable exhibits a unit root but the independent variables do not.
- C. independent variables exhibit unit roots but the dependent variable does not.

Answer = B

“Time-Series Analysis,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 13, Section 5.2

Study Session 3–13–c, j, k, n

Explain the requirement for a time series to be covariance stationary, and describe the significance of a series that is not stationary.

Describe implications of unit roots for time-series analysis, explain when unit roots are likely to occur and how to test for them, and demonstrate how a time series with a unit root can be transformed so it can be analyzed with an AR model.

Describe the steps of the unit root test for nonstationarity, and explain the relation of the test to autoregressive time-series models.

Explain how time-series variables should be analyzed for nonstationarity and/or cointegration before use in a linear regression.

B is correct. The Dickey–Fuller test uses a regression of the type:

$$x_t - x_{t-1} = b_0 + g_1 x_{t-1} + \epsilon_t, E(\epsilon_t) = 0.$$

The null hypothesis is $H_0: g_1 = 0$ versus the alternative hypothesis $H_1: g_1 < 0$ (a one-tail test). If $g_1 = 0$ the time series has a unit root and is nonstationary. Thus, if we fail to reject the null hypothesis, we accept the possibility that the time series has a unit root and is nonstationary.

Based on the t ratios and their significance levels in Exhibit 2, we reject the null hypothesis that the coefficient is zero for both outside air temperature and assembly line speed (i.e., the independent variables). We do not reject the null for the dependent variable, defective assemblies per hour.

36. Dennehy’s statement about the Dickey–Fuller test is *best* characterized as:

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- A. correct.
- B. incorrect because only the dependent variable series needs to be tested for the absence of a unit root.
- C. incorrect because only the independent variable series needs to be tested for the absence of a unit root.

Answer = A

“Time-Series Analysis,” Richard A. DeFusco, CFA, Dennis W. McLeavey, CFA, Jerald E. Pinto, CFA, and David E. Runkle, CFA

2013 Modular Level II, Vol. 1, Reading 13, Section 10

Study Session 3–13–n

Explain how time-series variables should be analyzed for nonstationarity and/or cointegration before use in a linear regression.

A is correct. One possibility is that none of the time series used in a regression exhibit a unit root. In that case, we can safely use regression analysis. Alternatively, as stated just after Example 21 in Section 10 of the reading:

If at least one time series (the dependent variable or one of the independent variables) has a unit root while at least one time series (the dependent variable or one of the independent variables) does not, the error term in the regression cannot be covariance stationary. Consequently, we should not use multiple linear regression to analyze the relation among the time series in this scenario.

Another possibility is that each time series, including the dependent variable and each of the independent variables, has a unit root. If this is the case, we need to establish whether the time series are cointegrated.

When all series used in a regression display unit roots, but they are also mutually cointegrated, we can safely use regression analysis.

Questions 37 to 48 relate to Financial Reporting and Analysis

Luhvul Cooperage Case Scenario

Sarah MacPhail is a food and beverage analyst at Carter-Brown Associates. In early 2012, she began to review several recent reports and the financial statements of Luhvul Cooperage Inc., listed as LUVU on the NASDAQ. The company’s financial statements are prepared under U.S. GAAP.

Luhvul is located just outside of Louisville, Kentucky, U.S.A. By U.S. law, Kentucky bourbon must be aged in brand-new, charred oak barrels. Luhvul purchases used barrels from the local distillers, reconditions them as needed, and resells them primarily to rum and whiskey producers worldwide. About 60% of sales are to the United Kingdom and about 25% to Chile, with all sales denominated in USD.

After reviewing Luhvul’s annual report, MacPhail became concerned that the company might be in violation of one or more of its debt covenants. Excerpts from the company’s financial statements are shown in Exhibit 1 and from the notes and MD&A in Exhibit 2.

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Exhibit 1 Luhvul Cooperage Inc. All figures in USD (thousands)			
Balance Sheet As of December 31			
	2011	2010	
Cash and A/R	7,653	5,907	
Inventories	<u>8,103</u>	<u>12,791</u>	
Total current assets	15,756	18,698	
Net property, plant, and equipment	<u>16,345</u>	<u>17,532</u>	
Total assets	<u>32,101</u>	<u>36,230</u>	
Total current liabilities	5,984	9,778	
Long-term debt	5,615	7,128	
Shareholders' equity	<u>20,502</u>	<u>19,324</u>	
Total liabilities and equity	<u>32,101</u>	<u>36,230</u>	
Income Statement For Periods Ending December 31			
	2011	2010	2009
Total revenues	64,302	51,852	66,786
Cost of goods sold	57,035	45,525	55,568
Selling and admin expense	5,025	4,137	5,604
Interest	<u>704</u>	<u>910</u>	<u>569</u>
Total costs and expenses	62,764	50,572	61,741
Earnings before tax	1,538	1,280	5,045

Exhibit 2 Luhvul Cooperage Inc. Selected Excerpts from Notes to the Financial Statements and Management's Discussion and Analysis All figures in USD (thousands) December 31, 2011	
1. Debt Covenants	As determined under FIFO accounting, throughout the term of the loan, the current ratio must equal or exceed 3.0 and the interest coverage ratio must equal or exceed 5.0 times.
2. Inventories	Inventories are reported on a LIFO basis. The LIFO reserve was \$4,994 and \$3,152 at the end 2011 and 2010, respectively. During 2011 the company liquidated certain LIFO inventories that had been carried at lower

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costs in prior years; the effect of the liquidation was to increase earnings before tax by \$1,517.

3. Operations

During 2011, activity at the local distillers was interrupted because of a four-month strike, which reduced the company's access to used barrels.

4. Executive Compensation – Stock Options

On January 1, 2011, the company granted 50,000 options on its common shares to its top managers. The options have the following features:

- The exercise price for all company stock options is the stock price on the date of the grant.
- Options cannot be exercised for 4 years and expire in 10 years from the grant date.
- Based on prior experience, it is estimated that options are exercised, on average, in five years.
- The related compensation expense is reported in selling and administrative expenses.

Exhibit 3 contains stock information and estimated option prices during 2011; option prices are estimated using the Black–Scholes model using assumptions contained in the Notes to the Financial Statements.

5. Executive Compensation – Stock Awards

In fiscal year 2012, the company will begin granting employees stock awards (SAs) rather than stock options as part of its executive compensation plans. SAs are grants that entitle the holder to shares of company stock as the award vests (normally a four-year period) with the award being based on accounting performance metrics as determined by the Compensation Committee of the Board of Directors.

Exhibit 3		
Luhvul Cooperage Inc.		
Stock Price and Estimated Option Prices throughout 2011		
Date	Stock Price	Option Price
January 1	\$18.00	\$4.38
July 1	\$21.00	\$6.40
December 31	\$23.00	\$7.78
Average for year	\$20.67	\$6.13

In reviewing the change in the company's executive compensation, MacPhail made the following three observations:

1. Management will have the same downside risk exposure from the stock awards plan as they currently face with the stock options plan.

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2. Because both the stock awards and stock options have the same vesting period, they will also have the same total effect on net income.
3. The issuance of new shares under the new stock awards plan should improve the company's debt/equity ratio.

Luhvul Cooperage had just entered into a joint venture with a wine maker, three other cooperage firms and McFadden BioGroup, Ltd. to develop processes that would accelerate the natural seasoning of wood used in the production of barrels. In the joint venture, named Oakwood BioTreatment Inc., each company is to provide equal funding and to share equally in the profits.

37. In regard to MacPhail's concern about the violation of debt covenants in 2011, the *most appropriate* conclusion is that:

- A. neither debt covenant is violated.
- B. only the current ratio covenant is violated.
- C. only the interest coverage ratio covenant is violated.

Answer = A

Financial Ratio List

2013 Modular Level II, Vol. 2, prior to Study Session 5

"Inventories: Implications for Financial Statements and Ratios," Michael A. Broihahn, CFA

2013 Modular Level II, Vol. 2, Section 3, Example 2

Study Session 5–17–b, c, e

Explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios.

Convert a company's reported financial statements from LIFO to FIFO for purposes of comparison.

Analyze and compare the financial statements and ratios of companies, including those that use different inventory valuation methods.

A is correct.

Current Ratio Calculation under FIFO		
	Current Assets FIFO = Current Assets LIFO + LIFO Reserve	15,756 + 4,994 = 20,750
	Current Ratio = Current Assets/Current Liability	20,750/5,984 = <u>3.47</u>
	The ratio exceeds the requirement of 3.0: no violation	
Interest Coverage Ratio Calculation under FIFO		
	COGS FIFO = COGS LIFO – Increase in LIFO Reserve	57,035 – (4,994- 3,152) = 55,193

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EBIT = Total Revenues – COGS – S&A expense	$64,302 - 55,193 - 5,025 = 4,084$
Interest Coverage Ratio = EBIT/Interest	$4,084/704 = \underline{5.80}$
The ratio exceeds the requirement of 5.0 times: no violation	
Neither ratio is violated under FIFO accounting	

38. If the liquidation of LIFO inventories in 2011 had not occurred, the gross profit margin for the company would have been *closest* to:

- A. 8.9%.
- B. 11.3%.
- C. 13.6%.

Answer = A

“Inventories: Implications for Financial Statements and Ratios,” Michael A. Broihahn, CFA

2013 Modular Level II, Vol. 2, Section 3.2

Study Session 5–17–b, e

Explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios.

Analyze and compare the financial statements and ratios of companies, including those that use different inventory valuation methods.

A is correct. From Note 2 in Exhibit 2, the effect of the LIFO liquidation was to increase earnings before tax. A LIFO liquidation lowers the COGS and thereby increases gross profit. Removing the LIFO liquidation reduces gross profit.

Gross profit as reported based on Total revenues	$64,302 - 57,035 =$	7,267
Pre-tax effect of LIFO liquidation		<u>(1,517)</u>
Gross profit with LIFO liquidation removed		5,750
Revised gross profit margin = Gross profit ÷ Total revenues × 100	$5,750 \div 64,302 \times 100 =$	8.9%

39. The *most likely* explanation that MacPhail can give for the inventory liquidation described in Exhibit 2 is that there were:

- A. supply chain problems.
- B. increased foreign sales.
- C. recent purchases at lower costs.

Answer = A

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“Inventories: Implications for Financial Statements and Ratios,” Michael A. Broihahn, CFA
2013 Modular Level II, Vol. 2, Section 3.2
Study Session 5–17–b

Explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios.

A is correct. During 2011, activity at the local distillers was reduced because of a four-month strike and the company’s access to used barrels was reduced. With sales increasing, older layers of lower-cost inventory must have been accessed throughout the year and replaced with higher cost items as the LIFO reserve increased by year-end.

40. The compensation expense for 2011 arising from the executive stock options granted in 2011 is *closest* to:
- A. \$43,800.
 - B. \$54,750.
 - C. \$76,625.

Answer = B

“Employee Compensation: Post-Employment and Share-Based,” Elaine Henry, CFA, and Elizabeth A. Gordon
2013 Modular Level II, Vol. 2, Sections 3.1, 3.2
Study Session 6–20–h

Explain the impact on financial statements of accounting for stock grants and stock options, and the importance of companies’ assumptions in valuing these grants and options.

B is correct.

Compensation expense arising from executive stock options is based on the estimated fair value of the options on the grant date and amortized on a straight-line basis over the service period. The service period is the period between the grant date and the vesting period. The vesting date is the first date on which the options can be exercised.		
Total compensation expense:	50,000 options × \$4.38/option =	\$219,000
Vesting period		4 years
Annual compensation expense	\$219,000 ÷ 4 years =	\$54,750

41. Which of MacPhail’s observations about the new executive compensation plan is *most* accurate?
- A. 1
 - B. 2
 - C. 3

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Answer = A

“Employee Compensation: Post-Employment and Share-Based,” Elaine Henry, CFA, and Elizabeth A. Gordon

2013 Modular Level II, Vol. 2, Sections 3, 3.1, 3.2

Study Session 7–20–g, h

Explain issues involved in accounting for share-based compensation.

Explain the impact on financial statements of accounting for stock grants and stock options, and the importance of companies’ assumptions in valuing these grants and options.

A is correct.

Observation 1	Correct	The downside risk is the same under both plans– namely, zero. Management is not penalized if the share price falls or if the accounting metrics are missed; they simply don’t receive a bonus.
Observation 2	Incorrect	Although the vesting period for both plans is the same, the expenses will differ because the total amount to be expensed is determined differently under stock options and stock grants. The expense under the current option plan is based on the estimated fair value of the option, but the expense under the proposed stock grant plan is based on the actual current share price.
Observation 3	Incorrect	The new stock awards plan will have no effect on the debt/equity ratio because there will be no change in equity: Retained earnings will be decreased by the amount of the expense and paid-in capital increased by an equivalent amount.

42. The *most* appropriate way for Luhvul Cooperage to account for its investment in Oakwood BioTreatment Inc. is to use:

- A. the equity method.
- B. fair value designation.
- C. proportionate consolidation.

Answer = A

“Intercompany Investments,” Susan Perry Williams

2013 Modular Level II, Vol. 2, Section 5

Study Session 6–19–b

Distinguish between IFRS and U.S. GAAP in the classification, measurement, and disclosure of investments in financial assets, investments in associates, joint ventures, business combinations, and special purpose and variable interest entities.

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A is correct. Under U.S. GAAP, joint ventures must be accounted for using the equity method.

Nation Resorts Ltd. Case Scenario

Nation Resorts Ltd (Nation) is a U.S.-based operator of destination vacation resorts. Resorts are divided into three types: winter, which are located at ski mountains; golf, located on championship courses in locations such as Arizona; and seaside, located at world-class ocean beaches. The three types of resorts generally attract different types of vacationers, and provide different vacation packages for different vacation budgets. Although the winter and golf resorts are somewhat counter-seasonal the company still suffers from the risk of the U.S. economy as well as the risk of unfavorable local weather conditions (lack of snow or sun). To diversify and reduce these risks, Nation started purchasing properties in other geographic areas, including Europe and Central America.

Nation made its first foreign investment when it bought a resort in Jamaica on May 1, 2008. Initially, Nation provided managers to assist in operating the resort but then hired local Jamaicans for their management development program, one of whom was recently appointed to a senior position at the resort. Nation invested in building and upgrading facilities with the initial expansion financing provided by Nation's U.S. bank. Concerned about the high rate of inflation in Jamaica, which at the time of purchase had averaged 20% per year over the previous three years, Nation kept any excess funds in U.S. dollars. Vacation packages are sold primarily in the United States and prices reflect competitive conditions in the U.S. vacation market. The resort uses local labor and supplies and is expected to be profitable for the first time this year (2010). Inflation has now declined to 14% per year, and Nation expects to be able to reinvest any profits in the resort and start using a local bank for on-going financing needs.

On July 1, 2010, Nation acquired its first European resort, Val Blanc SA, a ski resort in the Alps region of France. Nation paid €28 million for 100% of the company. The resort attracts skiers primarily from France and other European countries. The transition has gone very well with Nation leaving the local managers in place to make all operating and financial decisions. To date the only financial contribution by Nation has been the initial equity investment. Financial statements for the ski resort at acquisition and for the six months since acquisition are shown in Exhibit 1.

Exhibit 1
Val Blanc SA
Financial Statements
(all figures in thousands)

Income Statement

	<u>Dec 31, 2010</u>	<u>June 30, 2010</u>
	<u>6 months</u>	<u>12 months</u>
Resort revenues	€12,025	€46,805
Operating expenses	9,800	35,105
Depreciation and amortization	1,750	4,000

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Interest expense	1,200	2,500
Earnings before taxes	€(725)	€5,200
Income taxes	0.00	1,300
Net earnings	€ (725)	€3,900

Statement of Financial Position		
	<u>Dec 31, 2010</u>	<u>June 30, 2010</u> ⁽¹⁾
Cash and marketable securities	€5,750	€5,000
Accounts receivable	6,500	3,000
Inventory	8,000 ⁽²⁾	5,000
Total current assets	€20,250	€13,000
Property, plant and equipment	41,750	43,500
Intangible assets	5,000	5,000
Total assets	€ 67,000	€ 61,500
Current liabilities	€12,225	€5,000
Long-term debt	26,000	27,000
Share capital	20,000	20,000
Retained earnings	8,775	9,500
Total liabilities and equity	€67,000	€61,500

(1) The June 30, 2010, Statement of Financial Position reflects the fair value of the identifiable assets and liabilities of Val Blanc at acquisition.

(2) December 31, 2010, inventory was acquired evenly throughout the period since acquisition.

It is now early January 2011, and Paul Nakiska, a business analyst with Nation, is meeting with Nation's manager of financial reporting, Max Chara, to discuss how the company should account for the two foreign resorts in the 2010 financial statements and the impact the resorts will have on Nation's reported results. Nation has a December 31 year-end and prepares its financial statements according to U.S. GAAP.

In preparation for the meeting Nakiska's first task was to prepare the purchase price allocation of the Val Blanc acquisition using the acquisition method. He has also gathered some exchange rate information related to the two resorts, as shown in Exhibit 2.

Exhibit 2
Selected Exchange Rates

Date	USD = 1JMD	USD = 1EUR
May 1, 2008	0.0139	N/A

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January 1, 2010	0.0115	1.4368
June 30, 2010	0.0117	1.2250
December 31, 2010	0.0117	1.3261
Average 2010	0.0115	1.3277
Average January – July 2010	0.0113	1.3303
Average July – December 2010	0.0117	1.3198

Nakiska started the meeting:

I suggest we use the current rate method for both our foreign subsidiaries because that will simplify our financial reporting. The current rate method also allows the key metrics we use to evaluate performance—the current ratio, fixed asset turnover, and operating margin— to be the same after translation as they are before.

Chara replied:

I am not so concerned about the translated metrics because we evaluate the performance of each resort in its local currency; however, I am concerned about the effect on Nation’s consolidated net income and return on equity.

If we use the temporal method for the resort in France, we can take advantage of the strengthening euro and report the translation gain on the income statement.

I am also not so concerned about using the same method for all subsidiaries, if using different methods will help increase our net income.

Nakiska agreed to calculate the effects of the various translation methods and of the Val Blanc acquisition on the financial statements and send a report to Chara.

43. In 2008, Nation *most likely* used which of the following translation methods for the Jamaican resort?
The:

- A. temporal method because of the high rate of inflation.
- B. temporal method because the U.S dollar was the functional currency.
- C. current rate method because the Jamaican dollar was the functional currency.

Answer = B

“Multinational Operations,” Timothy S. Douppnik
2013 Modular Level II, Vol.2, Section 3.2, 3.2.2, 3.2.4
Study Session: 6–21–a, f

Distinguish among presentation currency, functional currency, and local currency.

Analyze the effect of alternative translation methods for subsidiaries operating in hyperinflationary economies.

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B is correct. Based on the facts described, the U.S dollar was the functional currency of the resort in 2008. The U.S. economy and the USD are the factors that influence the prices of the vacation packages. The operations were financed from the United States and excess funds were also invested there. Nation also supplied onsite management. Therefore, the temporal method would be the most appropriate method to use. FASB requires that the temporal method be used for subsidiaries during periods of normal inflation, and the current rate method be used during periods of hyperinflation. Although inflation was high at 20% per year over the prior three years, that would not meet FASB's definition of hyperinflation.

44. Prior to translating the subsidiary's financial statements, Nakiska's allocation of the purchase price of the acquisition of Val Blanc will *most likely* result in which of the following for Nation?

- A. A gain of €1,500
- B. Goodwill of €8,000
- C. An increase in retained earnings of €9,500

Answer = A

"Intercompany Investments," Susan Perry Williams

2013 Modular Level II, Vol.2, Section 6.2.6

Study Session: 6–19–a, c

Describe the classification, measurement, and disclosure under International Financial Reporting Standards (IFRS) for: 1) investments in financial assets, 2) investments in associates, 3) joint ventures, 4) business combinations, and 5) special purpose and variable interest entities.

Analyze effects on financial statements and ratios of different methods used to account for intercompany investments.

A is correct. The acquisition was a bargain purchase for Nation:

Price paid for 100%	€28,000
Fair value of the net assets (Exhibit 1 & Footnote 1)	
Share capital + retained earnings = 20,000 + 9,500	<u>29,500</u>
Negative goodwill	€ (1,500)
Negative goodwill is recognized immediately as a gain in profit or loss.	

45. The net income (in USD) from the Val Blanc subsidiary that will be included in Nation's income for 2010 is *closest* to:

- A. (791).
- B. (957).
- C. (961).

Answer = B

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“Multinational Operations,” Timothy S. Douppnik

2013 Modular Level II, Vol.2, Section 3.2.1

Study Session: 6–21–c, d

Compare the current rate method and the temporal method, evaluate the effects of each on the parent company’s balance sheet and income statement, and determine which method is appropriate in various scenarios.

Calculate the translation effects, evaluate the translation of a subsidiary’s balance sheet and income statement into the parent company’s currency, and analyze the effects of the current rate method and the temporal method on the subsidiary’s financial ratios.

B is correct. The functional currency for the Val Blanc subsidiary is the euro: it operates independently and attracts European tourists. The prices are set in Euros and it is also financed in euros. Therefore, the financial statements would be translated using the current rate method. Under the current rate method, the net earnings (loss) is calculated using the average rate for the period: (€725) x \$1.3198/€1 = (\$957).

46. Using the translation method suggested by Nakiska, the total shareholders’ equity of the Val Blanc resort on December 31, 2010 after translation is *closest* to:

- A. \$32,203.
- B. \$35,181.
- C. \$38,159.

Answer = C

“Multinational Operations,” Timothy S. Douppnik

2013 Modular Level II, Vol. 2, Section 3.2.2, 3.2.3, Exhibit 4

Study Session: 6–21–d

Calculate the translation effects, evaluate the translation of a subsidiary’s balance sheet and income statement into the parent company’s currency, and analyze the effects of the current rate method and the temporal method on the subsidiary’s financial ratios.

C is correct. Total shareholders’ equity as at December 31, 2010, consists of share capital, retained earnings, and the cumulative foreign exchange gain or loss since acquisition. The total amount can be calculated either as the sum of the individual components or as the difference between assets and liabilities. Using the current rate method, all assets and liabilities are translated at the closing rate. Using the difference between assets and liabilities:

	€	Rate: \$/€	\$
Cash and marketable securities	5,750	1.3261	7,625
Accounts receivable	6,500	1.3261	8,620
Inventory	8,000	1.3261	10,609
Total current assets	20,250		
Property, plant and equipment	41,750	1.3261	55,365

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Intangible assets	5,000	1.3261	6,630
Total assets	<u>67,000</u>	Total assets	<u>88,849</u>
Current liabilities	12,225	1.3261	16,211
Long-term debt	26,000	1.3261	<u>34,479</u>
Share capital	20,000	Total liabilities	<u>50,690</u>
Retained earnings	<u>8,775</u>	Net assets	38,159
Total liabilities and equity	67,000		

Alternatively: $1.3261 \times [67,000 - (12,225 + 26,000)] = \mathbf{38,159}$.

Using the translation of individual items and calculation of the foreign exchange gain:

	Euros	Rate: \$/€ (1)	\$
Share capital	20,000	1.225	24,500
Retained earnings – opening	9,500	1.225	11,638
Net earnings (loss) for the period	(725)	1.3198	(957)
Foreign translation adjustment (2)			<u>2,978</u>
Total shareholders' equity			38,159

(1) In the current rate method, the share capital and opening retained earnings use the rate at the date of acquisition (July 1) and the change in retained earnings is equal to the net earnings (loss) for the period at the average rate (July-Dec).

(2) Foreign translation gain/loss calculation:

	Euros	Rate: \$/€	\$
Opening net asset position	29,500	1.225	36,138
Net loss	(725)	1.3198	<u>(957)</u>
Closing net asset position	28,775		35,181
Actual net asset position	28,775	1.3261	<u>38,159</u>
(gain) loss			(2,978)

47. Nakiska's comment about the key performance metrics is *least* accurate with respect to:

- A. current ratio.
- B. operating margin.
- C. fixed asset turnover.

Answer = C

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“Multinational Operations,” Timothy S. Douppnik
2013 Modular Level II, Vol. 2, Exhibit 4, Section 3.4
Study Session 6–21–d

Calculate the translation effects, evaluate the translation of a subsidiary’s balance sheet and income statement into the parent company’s currency, and analyze the effects of the current rate method and the temporal method on the subsidiary’s financial ratios.

C is correct.

Ratios involving:	Financial statement and ratio effects under the current rate method
only income statement items	All revenues and expenses are translated at the average rate for the year. Therefore, ratios involving only income statement numbers, like the operating margin, will be unaffected by translation.
only balance sheet items	All assets and liabilities are translated at the closing rate. Therefore, all ratios involving only asset and liability numbers, like the current ratio, will be unaffected by translation.
both income statement and balance sheet items	Because the two financial statements are translated at different rates, the fixed asset turnover ratio (sales ÷ fixed assets) is unlikely to provide the same result before and after translation, unless by chance the average rate happens to equal the closing rate.

48. Is Chara correct in his assessment of the effect of using the temporal method on the Val Blanc resort?

- A. No, because it would result in a translation loss on the income statement.
- B. Yes, because it would result in a translation gain on the income statement.
- C. No, because the translation gain or loss would not be reported in net income.

Answer = A

“Multinational Operations,” Timothy S. Douppnik
2013 Modular Level II, Vol. 2, Section 3.1.3
Study Session: 6–21–c, e

Compare the current rate method and the temporal method, evaluate the effects of each on the parent company’s balance sheet and income statement, and determine which method is appropriate in various scenarios.

Analyze the effect on a parent company’s financial ratios of the currency translation method used.

A is correct. The euro strengthened against the U.S dollar in the July – December period (\$1.225/€ to \$1.3261/€). Under the temporal method, the exposure is limited to monetary assets less monetary liabilities, which normally results in a net liability position (and does here for the Val Blanc subsidiary). When the foreign currency strengthens, a net liability position results in a negative translation adjustment (a loss). Hence, use of the temporal method would result in a translation loss being reported on the income statement and Chara’s statement is incorrect.

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Questions 49 to 54 relate to Corporate Finance

England Case Scenario

Telemtogo Inc. (TLGO) is a manufacturer and distributor of camping and hiking equipment in the U.S. TLGO management is considering a new division to manufacture outdoor patio products to be sold in the same retail outlets as TLGO's existing products.

Karen England is a consultant hired by TLGO to explore the feasibility/profitability of the new division. England begins by developing future financial projections for the division based on comparable firms that produce similar products. England assumes the capital investment will be made at the end of 2012 (see Exhibit 1).

Exhibit 1

TLGO Outdoor Patio Product Division

Abridged Financial Statement Year-End Projections (Inflation Adjusted)

Note: All values are in USD millions.

End of Year	2012	2013	2014	2015	2016	2017
Consultant fee	0.55					
Capital investment required	10.36					
Additional net working capital	2.20	0.62	0.43	0.28	0.19	0.12
Sales		2.70	3.24	3.89	4.67	5.60
Variable expenses		1.62	1.94	2.33	2.80	3.36
Fixed expenses		0.20	0.21	0.21	0.22	0.23
Depreciation		0.21	0.21	0.21	0.21	0.21
EBIT		0.67	0.88	1.14	1.44	1.81
Interest		0.36	0.36	0.36	0.36	0.36
Taxable income		0.31	0.52	0.78	1.08	1.45
Tax expense (32%)		0.10	0.17	0.25	0.34	0.46
Net income		0.21	0.35	0.53	0.74	0.99

Note: The inflation rate is assumed to be 0.78% annually.

England begins her analysis by determining TLGO's real weighted average cost of capital (real WACC) which she presents in Exhibit 2.

Exhibit 2

TLGO's Real WACC Components

Risk-free rate	2.5%
Market risk premium	8.2%

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Equity beta	1.6
Pre-tax cost of debt	9.3%
Real WACC	10.1%
Note: All values are nominal except for the real WACC, and project financing is with equal portions of debt and equity.	

She then proceeds to determine the feasibility of the project in two ways:

1. discounting the after-tax operating cash flows from the project and
2. calculating its economic profit.

In a phone conversation, Terry Weinberger, a member of TLGO's management team, suggests that the risk of the new division may be different from the current risk faced by TLGO, making TLGO's real WACC inappropriate for her analysis. He suggests incorporating the cost of equity from a firm within the outdoor patio products industry, Outerside Inc. (OUT), to obtain a more appropriate real WACC. England later estimates OUT's current beta and adjusts it to account for TLGO's leverage. The value of the adjusted beta for OUT is 1.8.

Weinberger continues to tell England that five years ago, TLGO considered acquiring OUT. Unfortunately, OUT successfully defended itself from being acquired by seeking an angel investor who bought a substantial minority stake of its stock—enough to block our hostile takeover bid.

Weinberger further suggests calculating the net present value (NPV) of the project with an assumption of selling the division for \$12 million at the end of 2017. All working capital can be recaptured. (Note: Capital gains are fully taxed at 32%.)

Weinberger also asks England to calculate the NPV for three different possible sets of economic conditions under which prices and costs differ to give management a broader perspective on the decision.

In response to the conversation with Weinberger, England produces the analysis in Exhibit 3.

Exhibit 3
NPV Analysis of TLGO Project

Economic conditions	Probability	NPV in USD millions
Below Average	25%	−5.21
Average	50%	−3.08
Above Average	25%	1.25

In a second phone conversation, England and Weinberger discuss the value of possible real options. When England implements the value of the real options into the NPV analysis, the expected NPV for the project based on Exhibit 3 becomes \$0.75 million.

49. The 2014 after-tax operating cash flow for the new division (in USD millions) is *closest* to:

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- A. 0.38.
- B. 0.56.
- C. 0.81.

Answer = C

“Capital Budgeting,” John D. Stowe, CFA, and Jacques R. Gagné, CFA

2013 Modular Level II, Vol. 3, Reading 25, Section 5.3

Study Session 8–25–a

Determine the yearly cash flows of expansion and replacement capital projects, and evaluate how the choice of depreciation method affects those cash flows.

C is correct. Using Equation 8: after-tax operating cash flow (CF):

$$CF = [(Sales - Cash operating expenses) \times (1 - Tax rate)] + [Depreciation \times Tax rate].$$

$$CF = [(3.24 - 1.94 - 0.21) \times (1 - 0.32)] + [0.21 \times 0.32] = 0.8084 = 0.81.$$

50. Prior to her first conversation with Weinberger and using the information from Exhibits 1 and 2, England’s estimate of the 2013 economic profit for the new division (in USD millions) is *closest* to:

- A. –0.59.
- B. –0.81.
- C. –0.87.

Answer = B

“Capital Budgeting,” John D. Stowe, CFA, and Jacques R. Gagné, CFA

2013 Modular Level II, Vol. 3, Reading 25, Section 8.3.1

Study Session 8–25–h

Calculate and interpret accounting income and economic income in the context of capital budgeting.

B is correct. Using Equation 12: economic profit (EP):

$$EP = NOPAT - \$WACC = EBIT \times (1 - Tax rate) - WACC \times Capital.$$

Use the real WACC in Exhibit 2: 10.1%.

Find Capital at the beginning of 2013 (i.e., the end of 2012):

Capital = Investment = Capital investment required + Additional working capital.

$$Capital = 10.36 + 2.20 = 12.56.$$

Note: The consultant fee is a sunk cost.

Find EP:

$$EP = 0.67 \times (1 - 0.32) - 0.101 \times 12.56 = -0.813.$$

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51. Based on the first conversation with Weinberger, the *most* appropriate real cost of equity (%) for determining the net present value for the proposed new division is:

A. 14.7.
B. 16.4.
C. 17.1.

Answer = B

“Capital Budgeting,” John D. Stowe, CFA, and Jacques R. Gagné, CFA

2013 Modular Level II, Vol. 3, Reading 25, Sections 6.4, 7.4, 7.6

Study Session 8–25–b, e, g

Explain the effects of inflation on capital budgeting analysis.

Explain and calculate the discount rate, based on market risk methods, to use in valuing a capital project.

Describe common capital budgeting pitfalls.

B is correct. Based on the first phone conversation with Weinberger, the cost of equity for the new division should be implied from OUT. Further, the cost of equity implied from OUT is a nominal rate that will need to be inflation adjusted.

Imply nominal cost of equity from OUT using CAPM (R_F = risk-free rate) (data in Exhibit 2):

$$\text{Nominal cost of equity} = R_F + \text{Beta} \times \text{Market premium.}$$

$$\text{Nominal cost of equity} = 0.025 + 1.80 \times 0.082 = 0.1726.$$

Find real cost of equity:

$$\text{Real cost of equity} = \frac{(1 + \text{Nominal cost of equity})}{(1 + \text{Inflation rate})} - 1.$$

$$\text{Real cost of equity} = \frac{(1 + 0.1726)}{(1 + 0.0078)} - 1 = 0.1635.$$

52. Which of the following is the *best* characterization of OUT’s takeover defense tactic in response to TLGO’s takeover bid five years ago?

A. Greenmail
B. White Squire defense
C. White Knight defense

Answer = B

“Mergers and Acquisitions,” Rosita P. Chang, CFA, and Keith M. Moore, CFA

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2013 Modular Level II, Vol. 3, Reading 29, Section 5.2.5

Study Session 9–29–f

Distinguish among pre-offer and post-offer takeover defense mechanisms.

B is correct. OUT's takeover defense seeking an angel investor, who bought a substantial minority stake of its stock, enough to block our hostile takeover bid—is consistent with the White Squire defense.

53. If Weinberger is correct about the selling price of the division in 2017, the after-tax non-operating cash flow (in USD millions) from the sale is *closest* to:

- A. 11.13.
- B. 14.97.
- C. 15.32.

Answer = B

“Capital Budgeting,” John D. Stowe, CFA, and Jacques R. Gagné, CFA

2013 Modular Level II, Vol. 3, Reading 25, Sections 6.2-6.3

Study Session 8–25–a

Determine the yearly cash flows of expansion and replacement capital projects, and evaluate how the choice of depreciation method affects those cash flows.

B is correct. The after-tax non-operating cash flow is the \$12 million inflow less the taxes paid on the capital gains plus the net working capital that is recovered.

Book value of the assets = Initial capital investment – Accumulated depreciation:

$$9.31 = 10.36 - (5 \times 0.21).$$

Capital gains taxes: $= (12.00 - 9.31) \times 0.32 = 0.8608$.

Net cash inflow from sale $= 12.0 - 0.8608 = 11.13$.

The total net working capital investment that will be recovered:

$$3.84 = 2.20 + 0.62 + 0.43 + 0.28 + 0.19 + 0.12.$$

The after-tax non-operating cash flow:

$$14.97 = 11.13 + 3.84.$$

54. Following her second conversation with Weinberger and based on Exhibit 3, the expected additional value (in USD millions) created by real options is *closest* to:

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- A. -1.78.
- B. 3.28.
- C. 3.83.

Answer = B

“Capital Budgeting,” John D. Stowe, CFA, and Jacques R. Gagné, CFA
 2013 Modular Level II, Vol. 3, Reading 25, Section 7.5
 Study Session 8–25–f

Describe types of real options and evaluate a capital project using real options.

B is correct. Find the expected NPV in Exhibit 3:

$$-2.53 = (0.25) \times (-5.21) + (0.50) \times (-3.08) + (0.25) \times (1.25).$$

The additional value of the real options is the expected NPV with real options (0.75) less the expected NPV in Exhibit 3:

$$3.28 = 0.75 - (-2.53).$$

Questions 55 to 60 relate to Equity Investments

Vitality FoodGroup Case Scenario

Gregory Armishaw is an equity analyst at Fulsom-Wagner Investment Counsel in Minneapolis, U.S.A. Armishaw specializes in the food and beverage industry. In late January 2013, he had just become aware of a new salt substitute, SansSalt, which had been developed by a local company, Vitality FoodGroup, Inc. (NYSE listing: VFG). Prior to learning of this new development, Armishaw had a neutral rating on the company's shares.

VFG produces a wide variety of chemicals used in the food services industry. SansSalt can be used by food producers and processors to formulate low-sodium foods without sacrificing taste or functionality, replacing over 90% of the sodium content in their finished products.

With the continuing national concern over health matters arising from excessive salt use, Armishaw believes that the addition of this product line could be quite beneficial to VFG.

Armishaw told Anthony Stack, a junior analyst, that in his December 2012 valuation of VFG's common shares, he had considered the residual income model but settled on the H-model version of the dividend discount model. Stack summarizes the data that have been used in that valuation in Exhibits 1, 2, and 3.

Exhibit 1 Vitality FoodGroup, Inc. Free Cash Flow to the Firm December 31, 2012 USD millions	
Net income	\$422
Non-cash charges (depreciation)	174

Exhibit 2 Vitality FoodGroup, Inc. Selected Balance Sheet Data December 31, 2012 USD millions	
Total assets	<u>\$3,301</u>
Short-term liabilities	194

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After-tax interest expense	42
Investment in fixed capital	-208
Investment in working capital	-35
Free cash flow to the firm	<u>\$395</u>

Long-term debt	954
Common stock	1,075
Retained earnings	<u>1,078</u>
Total liabilities and equity	<u>\$3,301</u>

Exhibit 3 Vitality FoodGroup, Inc. Selected Information for Valuation December 31, 2012	
Weighted average cost of capital	11.9%
Cost of debt, before tax	7.0%
Cost of equity capital	15%
Expected dividend growth behavior:	
• Expected for 2013	14%
• After 2013, dividend growth rate declines linearly over a six-year period	
• Final and perpetual growth rate:	5%
Estimated EPS in 2018	\$5.04
Dividend payout ratio	40%
Shares outstanding	150 million

Stack noticed that in the 2012 valuation, Armishaw had assumed a sustainable growth rate of 5% following the period of high growth. His recollection was that the sustainable growth model assumes that the company will require:

1. external debt financing.
2. external equity financing.
3. improving return on equity.

Stack asked Armishaw what the present value of growth opportunities (PVGO) was for the perpetual growth period in his December 2012 valuation.

In their meeting on the following day, Armishaw said that he had been estimating the benefits that VFG would receive from its new SansSalt product. Exhibit 4 contains his revised estimates for the share price (as of January 15, 2013), assuming a terminal value in 2022 arising from a perpetuity based on 2022's residual income.

Exhibit 4 Vitality FoodGroup, Inc. Basis for Terminal Value and Revised Price Estimate January 15, 2013	
Forecasted residual income per share at end of 2022	\$5.32
Estimated ROE in 2022	20%

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Nature of stream beyond 2022	Perpetuity
Growth rate beyond 2022	0%
Cost of equity	15%
Dividend payout	40%
Revised estimate of share price	\$45.50

Stack questions Armishaw's assumption in his 2013 valuation that a perpetuity would best describe the terminal value of the stream and suggests that residual income should fade over time. He further suggests that a persistence factor of 0.50 might be appropriate. Stack then determines the impact on the estimate of the VFG share price that his alternative assumptions about the terminal value would have.

Stack told Armishaw that he prefers the use of a residual income model to value the company over other available methods. He provides three justifications for his preference:

1. The model explicitly incorporates the cost of debt capital.
2. The model can be used when cash flows are unpredictable.
3. There is less of an impact arising from the uncertainty in forecasting terminal value.

55. In December 2012, Armishaw's estimate of VFG's residual income per share for 2014 was *closest* to:

- A. -\$0.28.
- B. \$0.84.
- C. \$1.17.

"Residual Income Valuation," Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 36, Section 2, Example 1

Study Session 12-36-a

Calculate and interpret residual income, economic value added, and market value added.

C is correct.

	2013	2014	<i>All numbers in millions except per share data</i>
Growth rate	14%	12.5%	2014 growth: $14\% - (14\% - 5\%)/6 \text{ years}$
Net income: \$422 in 2012	\$481.08	\$541.22	Prior year $\times (1 + g)$: $g=14\%$ and 12.5% , respectively
Less dividends	<u>192.43</u>	<u>216.49</u>	$40\% \times \text{Net income}$
Increase in retained earnings	\$288.65	\$324.73	
Starting equity	\$2,153.00	\$2,441.65	Start of 2013: \$1,075 + \$1,078
Increase in Retained earnings	<u>288.65</u>	<u>324.73</u>	

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Ending equity	\$2,441.65	\$2,766.38	
Net income		\$541.22	From above
Less equity charge		366.24	Starting equity × 15%
Residual income		\$174.98	
Residual income per share		\$1.17	Divide by 150 (million shares)

56. In December 2012, using the H-model, Armishaw's per share valuation of VFG's common shares would have been *closest* to:

- A. \$14.85.
- B. \$15.86.
- C. \$17.89.

Answer = A

"Discounted Dividend Valuation," Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 33, Section 5.3, Equation 20; Example 16

Study Session 11–33–I

Calculate and interpret the value of common shares using the two-stage DDM, the H-model, and the three-stage DDM.

A is correct.

The value using the H-Model is:	
$V_0 = \frac{D_0(1 + g_L) + D_0H(g_S - g_L)}{r - g_L}$	$= \frac{1.125 \times (1 + 0.05) + 1.125 \times 3 \times (0.14 - 0.05)}{0.15 - 0.05}$ = \$14.85/sh
Where	
V_0 = value per share at $t=0$	
D_0 = current dividend = \$1.125	$\$422 \times 0.40 / 150$ = Net income × Payout / #shares
r = required return on equity = 0.15	= Cost of equity capital
H = half-life in years of high growth = 3	0.5 × 6 years of high growth
g_S = initial short-term dividend growth rate	14%
g_L = long-term growth rate after Year 2H	5%

57. Which of Stack's recollections about the assumptions underlying the sustainable growth rate model is *most* accurate?

- A. 1
- B. 2
- C. 3

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Answer = A

“Discounted Dividend Valuation,” Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 33, Section 6.1

Study Session 11–33–o

Calculate and interpret the sustainable growth rate of a company, and demonstrate the use of DuPont analysis to estimate a company’s sustainable growth rate.

A is correct. The sustainable growth rate model assumes that the growth will be financed with the issuance of debt and only internally generated equity to maintain a target capital structure. No additional common equity will be issued. The ROE is assumed to be a constant during this period.

58. The *most* appropriate answer to Stack’s question about the PVGO is:

- A. –\$13.44.
- B. –\$12.43.
- C. \$19.32.

Answer = B

“Discounted Dividend Valuation,” Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 33, Section 4.5

Study Session 11–33–e

Calculate and interpret the present value of growth opportunities (PVGO) and the component of the leading price-to-earnings ratio (P/E) related to PVGO.

B is correct.

Value of no-growth level perpetuity in 2018	$V_0 = 5.04/0.15 = \$33.60$	all EPS paid out as dividends
Value as a perpetual growing stream	$V_0 = \frac{D_1}{r - g}$ $= \frac{5.04 \times (1 + 0.05) \times 0.40}{0.15 - 0.05}$ $= \$21.17$	$D_1 = \text{EPS}_1 \times \text{Payout ratio}$ Perpetual growth at 5%
PVGO	$= \$21.17 - \$33.60 = \textbf{–\$12.43}$	$PV_{\text{Growth}} - PV_{\text{No growth}}$

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59. Compared to Armishaw's revised 2013 estimated price for VFG, Stack's assumption of a persistence factor results in a price that is *closest* to:

- A. \$6.50 lower.
- B. \$6.74 lower.
- C. \$26.30 higher.

Answer = A

"Residual Income Valuation," Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 36, Section 3.4; Example 10

Study Session 12–36–f, h

Calculate and interpret the intrinsic value of a common stock using single-stage (constant growth) and multi-stage residual income models.

Explain continuing residual income, and justify an estimate of continuing residual income at the forecast horizon, given company and industry prospects.

A is correct.

Armishaw's assumption	$V_T = \frac{5.32}{0.15} = \35.47	Perpetuity of \$5.32 per year starting in 2023
Stack's assumption		
Estimated 2023 growth rate	$0.20 \times 0.60 = 0.12$	$ROE_{2022} \times retention\ ratio$
Residual income in 2023	$5.32 \times 1.12 = 5.95$	$RI_{2023} = RI_{2022} \times (1 + 0.12)$
Terminal value 2023	$\frac{5.95}{(1 + 0.15 - 0.50)} = \9.15	$V_T = \frac{RI_{2023}}{(1 + r - \omega)}$
Difference in V_T	$9.15 - 35.47 = -26.32$	Stack's vs. Armishaw's
Difference in $PV(V_T)$	$\frac{-26.32}{(1.15)^{10}} = -6.50$	Stack's estimate will be 6.50 lower
where r : required return on equity; ω : persistence factor for residual income; V_T : terminal value at forecast horizon		

60. The *least* appropriate justification that Stack makes in support of the use of the residual income model is:

- A. 1.

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- B. 2.
- C. 3.

Answer = A

“Residual Income Valuation,” Jerald Pinto, CFA, Elaine Henry, CFA, Thomas Robinson, CFA, and John Stowe, CFA

2013 Modular Level II, Volume 4, Reading 36, Sections 4.1

Study Session 12–36–i, j

Compare residual income models to dividend discount and free cash flow models.

Explain the strengths and weaknesses of residual income models, and justify the selection of a residual income model to value a company’s common stock.

A is correct. The residual income model uses accounting income estimates and assumes that the cost of debt capital is properly reflected by interest expense, but because of changing market conditions, interest expense may not be a good proxy for the company’s cost of debt capital.

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