2007 FRM Practice Exams

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2007 FRM Practice Exams

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Introduction

The FRM exam is a practice-oriented examination. Its questions are derived from a combination of theory, as set forth in the core readings, and "real-world" work experience. Candidates are expected to understand risk management concepts and approaches and how they would apply to a risk manager's day-to-day activities.

The FRM examination is also a comprehensive examination, testing a risk professional on a number of risk management concepts and approaches. It is very rare that a risk manager will be faced with an issue that can immediately be slotted into one category. In the real world, a risk manager must be able to identify any number of risk-related issues and be able to deal with them effectively.

The 2007 FRM Practice Exams I, II and III have been developed to aid candidates in their preparation for the FRM Examination in November 2007. These practice exams are based on a sample of questions from the 2004 FRM Examination and are representative of the questions that will be in the 2007 FRM Examination. Wherever necessary and possible, questions, answers and references have been updated to better reflect the topics and core readings listed in the 2007 FRM Examination Study Guide.

The 2007 FRM Practice Exam I, II and III each contain 40 multiple-choice questions. Note that the 2007 FRM Examination will consist of a morning and afternoon session, each containing **70** multiple-choice questions. The practice exams were designed to be shorter to allow candidates to calibrate their preparedness without being overwhelming.

The 2007 FRM Practice Exams I, II and III do not necessarily cover all topics to be tested in the 2007 FRM Examination. For a complete list of topics and core readings, candidates should refer to the 2007 FRM Examination Study Guide. Core readings were selected by the FRM Committee to assist candidates in their review of the subjects covered by the exam. Questions for the FRM examination are derived from the "core" readings. It is strongly suggested that candidates review these readings in depth prior to sitting for the exam.

Suggested Use of Practice Exams

To maximize the effectiveness of the practice exams, candidates are encouraged to follow these recommendations:

- Plan a date and time to take each practice exam. Set dates appropriately to give sufficient study/review time between each practice exam and prior to the actual exam.
- Simulate the test environment as closely as possible.
    - Take each practice exam in a quiet place.
    - Have only the practice exam, candidate answer sheet, calculator, and writing instruments (pencils, erasers) available.
    - Minimize possible distractions from other people, cell phones and study material.
    - Allocate 90 minutes for each practice exam and set an alarm to alert you when 90 minutes have passed. Complete each exam but note the questions answered after the 90 minute mark.
    - Follow the FRM calculator policy. You may only use a Texas Instruments BA II Plus (including the BA II Plus Professional) calculator or a Hewlett Packard 12C (including the HP 12C Platinum) calculator.
- After completing each practice exam,
    - Calculate your score by comparing your answer sheet with the practice exam answer key. Only include questions completed in the first 90 minutes.
    - Use the practice exam Answers & Explanations to better understand correct and incorrect answers and to identify topics that require additional review. Consult referenced core readings to prepare for exam.
    - Pass/fail status for the actual exam is based on the distribution of scores from all candidates, so use your scores only to gauge your own progress and preparedness.

2007 FRM Practice Exam I
Candidate Answer Sheet

1.	a.	b.	c.	d.	21.	a.	b.	c.	d.
2.	a.	b.	c.	d.	22.	a.	b.	c.	d.
3.	a.	b.	c.	d.	23.	a.	b.	c.	d.
4.	a.	b.	c.	d.	24.	a.	b.	c.	d.
5.	a.	b.	c.	d.	25.	a.	b.	c.	d.
6.	a.	b.	c.	d.	26.	a.	b.	c.	d.
7.	a.	b.	c.	d.	27.	a.	b.	c.	d.
8.	a.	b.	c.	d.	28.	a.	b.	c.	d.
9.	a.	b.	c.	d.	29.	a.	b.	c.	d.
10.	a.	b.	c.	d.	30.	a.	b.	c.	d.
11.	a.	b.	c.	d.	31.	a.	b.	c.	d.
12.	a.	b.	c.	d.	32.	a.	b.	c.	d.
13.	a.	b.	c.	d.	33.	a.	b.	c.	d.
14.	a.	b.	c.	d.	34.	a.	b.	c.	d.
15.	a.	b.	c.	d.	35.	a.	b.	c.	d.
16.	a.	b.	c.	d.	36.	a.	b.	c.	d.
17.	a.	b.	c.	d.	37.	a.	b.	c.	d.
18.	a.	b.	c.	d.	38.	a.	b.	c.	d.
19.	a.	b.	c.	d.	39.	a.	b.	c.	d.
20.	a.	b.	c.	d.	40.	a.	b.	c.	d.

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2007 FRM Practice Exam I
Questions

1. Under the Advanced Measurement Approach for operational risk of Basel II, which of the following may be used for measuring operational risk?

   I. Scorecard approach
   II. Historical loss experience data
   III. Standardized Alternative Approach
   IV. Scenario analysis

   a. I, II and IV only
   b. II and III only
   c. III and IV only
   d. III only

2. Consider a portfolio with 40% invested in asset X and 60% invested in asset Y. The mean and variance of return on X are 0 and 25 respectively. The mean and variance of return on Y are 1 and 121 respectively. The correlation coefficient between X and Y is 0.3. What is the nearest value for portfolio volatility?

   a. 9.51%
   b. 8.60%
   c. 13.38%
   d. 7.45%

3. A fund manager has a USD 100 million portfolio with a beta of 0.75. The manager has bullish expectations for the next couple of months and plans to use futures contracts on the S&P500 to increase the portfolio´s beta to 1.8. Given the following information, which strategy should the fund manager follow.

   - The current level of the S&P index is 1250
   - Each S&P futures contract delivers USD 250 times the index
   - The risk-free interest rate is 6% per annum

   a. Enter into a long position of 323 S&P futures contracts
   b. Enter into a long position of 336 S&P futures contract
   c. Enter into a long position of 480 S&P futures contracts
   d. Enter into a short position of 240 S&P futures contracts

4. A risk manager wants to recommend a reduction in firm-wide risk. To achieve that reduction, the firm has to cut some positions. She decides to cut her positions rapidly, but to minimize the cost of doing so, she chooses to leave intact her least liquid position. If the following is the list of her positions, which position would she not cut?

   a. On-the-run US Treasuries
   b. Exchange traded eurodollar futures contracts
   c. Large cap listed equities
   d. Rated benchmark corporate bonds

5. Which of the following is not considered an event risk?

   a. Legal risk
   b. Business risk
   c. Disaster risk
   d. Reputation risk

6. The Markov property of stock prices is consistent with which form of market efficiency?

   a. Constant
   b. Semi-strong
   c. Strong
   d. Weak

7. One of your colleagues believes that risk management is driven by well-meaning regulators but it does not create economic value. Which of the following concepts would not be helpful to persuade him that risk management can create value for a firm?

   a. Deadweight costs of financial distress and bankruptcy
   b. Debt overhang mitigation
   c. Homemade hedging for well-diversified shareholders
   d. Tax rationale when income is taxed differently at different levels of income

8. Which one of the following approaches/financial instruments can an originator use to transfer to a third party some of the risk of a securitization?

   a. Sale of assets
   b. Credit derivatives
   c. Repurchase and sale agreements
   d. Interest rate swaps

9. Which of the following is not an area typically focused on by rating agencies when assigning credit ratings?

a. Competitive position of the firm in its industry
b. Management quality
c. Fairness of employee performance-based compensation
d. Financial policy of the firm

10. The Loss Distribution Approach (LDA) to operational risk uses historical information of operational loss events to determine capital calculations. Which of the following is not an advantage of using the LDA approach?

a. Results are based on the unique characteristics of each institution instead of relying on industry averages.
b. Results are forward-looking. Expected future results are reflected in the data.
c. Results are based on mathematical principals of term and level of confidence similar to those used for market and credit risk capital.
d. Results will evolve over time based on changes in the institutions loss experience.

11. When can you use the Normal distribution to approximate the Poisson distribution, assuming you have "n" independent trials each with a probability of success of "p"?

a. When the mean of the Poisson distribution is very small.
b. When the variance of the Poisson distribution is very small.
c. When the number of observations is very large and the success rate is close to 1.
d. When the number of observations is very large and the success rate is close to 0.

12. Diseconomies of scale imply that:

a. As the output of a financial institution increases, average costs of production decrease.
b. Small financial institutions are more cost efficient than large ones.
c. Small financial institutions do not prosper in a freely competitive environment.
d. Revenues derived from major technological investments fail to cover development costs providing a distinct advantage to smaller financial institutions.

13. There are 10 bonds in a credit default swap basket. The probability of default for each of the bonds is 5%. The probability of any one bond defaulting is completely independent of what happens to the other bonds in the basket. What is the probability that exactly one bond defaults?

a. 5%
b. 50%
c. 32%
d. 3%

14. Which of the following statements is correct when comparing the differences between an interest rate swap and a currency swap?

a. At maturity, there is no exchange of principal between the counterparties in interest rate swaps and there is an exchange of principle in currency swap transactions.
b. At maturity, there is no exchange of principal between the counterparties in currency swaps and there is an exchange of principle in interest rate swap transactions.
c. The counterparties in a interest rate swap need to consider fluctuations in exchange rates, while currency swap counterparties are only exposed to fluctuations in interest rates.
d. Currency swap counterparties are exposed to less counterparty credit risk due to the offsetting effect of currency risk and interest rate risk embedded within the transaction.

15. Assuming the stock price and all other variables remain the same what will be the impact of an increase in the risk-free interest rate on the price of an American put option?

a. No impact.
b. Negative.
c. Positive.
d. Cannot be determined.

16. The payoff to a swap where the investor receives fixed and pays floating can be replicated by all of the following except:

a. A short position in a portfolio of FRAs.
b. A long position in a fixed rate bond and a short position in a floating rate bond.
c. A short position in an interest rate cap and a long position in an interest rate floor.
d. A long position in a floating rate note and a short position in an interest rate floor.

17. All other things being equal, which of the following would you expect to increase the yield-to-maturity (YTM) of a corporate bond ?

I. An increase in the risk-free interest rate
II. An increase in the company's business risk
III. An increase in the company's leverage ratio

a. III only
b. I and II only
c. I and III only
d. I, II and III

18. Which of the following are key input variables in the CreditRisk+ model?

a. Asset return volatilities and asset return correlations.
b. Recovery factors and spread curves.
c. Standard deviation of default rates and recovery rates.
d. Default correlations and the credit quality of obligors.

19. Which one of the following statements is incorrect regarding the properties of volatility smiles?

a. One possible reason for the smile in equity options is that people are concerned about stock market crashes.
b. Referring to the volatility smile of foreign currency options, implied volatility of at-the-money options is relatively low and it becomes higher for the deep in-the-money options and deep out-of-the-money options.
c. A volatility smile in foreign currency options exists because traders think that the lognormal distribution underestimates the likelihood of an extreme exchange rate movement.
d. The implied volatility of equity options increases as the strike price increases.

20. Consider a 2-year, 6% semi-annual coupon bond currently yielding 5.2% on a bond equivalent basis. If the Macaulay Duration of the bond is 1.92 years, its Modified Duration is closest to:

a. 1.97 years
b. 1.78 years
c. 1.87 years
d. 2.04 years

21. There are several approaches to forecasting operational risk losses. Which of the following alternatives cannot be used to forecast a typical operational loss?

a. GARCH models
b. Factor-based models
c. Loss scenario models
d. Statistical/Actuarial models

22. Which of the following is not a standard practice used in the derivatives market to reduce credit risk among counterparties?

a. Adopting a master netting agreement
b. Agreeing to material adverse change covenants
c. Using initial and variation margin agreements
d. Including rating downgrade triggers in credit agreements

23. Which of the following divisions of a large multi-national bank would typically have the highest market risk?

a. Investment banking
b. Treasury management
c. Private banking
d. Retail brokerage

24. • The two-year risk-free rate in the United Kingdom is 8% per annum, continuously compounded
• The two-year risk-free rate in France is 5% per annum, continuously compounded
• The current French Franc to the GBP currency exchange rate is that one unit of GBP currency costs 0.75 units of French Franc's

If the observed two-year forward price of one unit of the GBP is 0.850 units of the French Franc, what is your strategy to make an arbitrage profit?

a. Borrow GBP, buy French Francs and enter a short forward contract on French Francs.
b. Borrow GBP, buy French Francs, and enter a short forward contract on GBP.
c. Borrow French Francs, buy GBP, and enter a short forward contract on French Francs.
d. Borrow French Francs, buy GBP, and enter a short forward contract on GBP.

25. Which of the following is not an advantage of the Loss-Scenario Model (LSM) in operational risk?

a. LSM's may be useful in identifying the weaknesses of a particular strategy.
b. LSM's may be useful in identifying the need for recovery planning and crisis management.
c. LSM's may be useful in aggregating scenarios into a complete picture of operational risk of the firm.
d. LSM's may be useful as they are intuitively attractive and easy to comprehend.

26. Let Z be a standard normal random variable. An event X is defined to happen if either z takes a value between –1 and 1 or z takes any value greater than 1.5. What is the probability of event X happening if N(1) = 0.8413, N(0.5) = 0.6915 and N(-1.5) = 0.0668, where N() is the cumulative distribution function of a standard normal variable?

a. 0.083
b. 0.2166
c. 0.6826
d. 0.7494

27. Which of the following is not a feature of CreditMetrics?

a. It takes a portfolio approach to measuring credit risk.
b. It handles correlations across credit exposures.
c. It handles migration risk.
d. It handles full defaults but not partial defaults and/or recoveries.

28. For a company starting with rating B in year 1, calculate the default (rating D) probability for year 2.

Starting	Ending			
	A	B	C	D
A	0.98	0.02	0.00	0.00
B	0.12	0.86	0.02	0.00
C	0.00	0.05	0.75	0.20
D	0.00	0.00	0.00	1.00

a. 0.40%
b. 2.00%
c. 17.20%
d. 65.00%

29. In determining an appropriate swap spread in a first-to-default swap consisting of a basket of underlying credits, how is correlation between the credits generally related to the final pricing of the swap spread?

a. Directly
b. Inversely
c. It does not come into effect.
d. It is difficult to say because correlations on credit risky assets are often impossible to calculate.

30. Let X and Y be two random variables representing the annual returns of two different portfolios. If E[X] = 3, E[Y] = 4 and E[XY] = 11, then what is Cov[X, Y]?

a. -1
b. 0
c. 11
d. 12

31. Based upon historical migration tables published by public debt rating agencies, which of the following statements is true?

a. We should expect to see the greatest amount of credit rating stability over long periods of time (e.g., ten-years). Credit ratings will tend to change more during shorter periods of time.
b. We should expect to see credit ratings change by about the same amount over time. The ratings transition matrix shows approximately the same figures for the one-year, five-year, and ten-year time horizons.
c. We should expect to see the highest level of rating stability during the one-year timeframe. This stability will decline at both the five-year time frame and even more so at the ten-year horizon.
d. We should expect to see the highest level of rating stability in the intermediate term (five-year time frame). Risk ratings will tend to have changed more at both the one-year and ten-year horizons.

32. Which of the following statements about American stock options is false?

a. American options can be exercised at or before maturity.
b. American options are always worth at least as much as European options.
c. American options can easily be valued with Monte Carlo simulation.
d. American options can be easily valued with binomial trees.

33. Which of the following is (are) true regarding the Black-Scholes model?

I. The Black-Scholes model assumes that stock returns are lognormally distributed.
II. The Black-Scholes model assumes that stocks are continuously traded.
III. The Black-Scholes model assumes that the risk-free interest rate is constant and the same for all maturities.

a. I only
b. III only
c. II and III
d. I, II and III

34. When evaluating asset-backed securitization issues, which of following would be least important during the investor's analysis process?

a. The liability concentration levels of the asset originator.
b. The structure of the underlying securitization transaction.
c. The quality of the loan servicer for the underlying assets in the transaction.
d. The quality of the underlying assets within the securitization structure.

35. Which of the following are critical prerequisites to successfully implementing an operational risk indicator program within an organization?

I. The firm needs to be able to identify risk profiles at various levels within the organization.
II. Involvement of line managers in developing the risk indicators
III. Availability of a meaningful data pool (for example, transaction volume, financial data, efficient data collection processes and procedures)

a. I and III only
b. I and II only
c. II and III only
d. I, II and III

36. A bright quantitative analyst in your risk management department has developed a new risk measure that promises to be applicable to a wide set of risks across your firm. As a first step in your evaluation, you ask the analyst to demonstrate that it is a coherent risk measure. The results are listed below. Which equation shows that it is not a coherent risk measure?

Given:
• x and y are state-contingent payoffs of two different portfolios
• p(x) and p(y) are the risk measures of the two portfolios respectively
• a and b are arbitrary constants (with a > 0)
• r is the risk-free rate

a. $p(x + y) \leq p(x) + p(y)$
b. $p(ax) = ap(x)$
c. $p(x) \leq p(y)$ if $x \leq y$
d. $p(x + b(1 + r)) = p(x) – b$

37. A CDO, consisting of three tranches, has an underlying portfolio of n corporate bonds with a total principal of USD N million. Tranche 1 has 10% of N and absorbs the first 10% of the default losses. Tranche 2 has 20% of N and absorbs the next 20% of default losses. The final Tranche 3 has 75% of N and absorbs the residual default loss. Which of the following statements are true?

I. Tranche 2 has the highest yield
II. Tranche 1 is usually called “Toxic Waste”
III. Tranche 3 would typically be rated as AAA by S&P
IV. Tranche 3 has the lowest yield

a. I only
b. IV only
c. II, III and IV only
d. II and IV only

38. A manager wants to swap a bond for a bond with the same price but higher duration. Which of the following bond characteristics would be associated with a higher duration?

I. A higher coupon rate
II. More frequent coupon payments
III. A longer term to maturity
IV. A lower yield

a. I, II and III
b. II, III and IV
c. III and IV
d. I and II

39. Which of the following statements is/are true?

I. In an add-up basket credit default swap, the pay-off occurs only when all reference entities default.
II. In a binary credit default swap, the payoff in the event of default is a fixed dollar amount.
III. In a total rate of return swap, the buyer of credit risk passes on any appreciation in the value of the underlying asset to the seller of credit risk.

a. I only
b. II only
c. I and II
d. II and III

40. Which of the following statement(s) is/are TRUE?

I. The scale parameter in Extreme Value Theory measures the speed at which the tail disappears
II. The shape parameter for empirical stock market data has a higher value than that of the normal distribution
III. Normal distribution tails drop more slowly than for the empirical distribution for financial returns
IV. As the confidence level increases, the use of the Central Limit Theorem leads to an overestimate of the potential loss

a. II only
b. I and III only
c. II and III only
d. III and IV only

END OF 2007 FRM PRACTICE EXAM I

2007 FRM Practice Exam I

Answer Key

1.	●	b.	c.	d.	21.	●	b.	c.	d.
2.	a.	b.	c.	●	22.	a.	●	c.	d.
3.	a.	●	c.	d.	23.	a.	●	c.	d.
4.	a.	b.	c.	●	24.	a.	b.	c.	●
5.	a.	●	c.	d.	25.	a.	b.	●	d.
6.	a.	b.	c.	●	26.	a.	b.	c.	●
7.	a.	b.	●	d.	27.	a.	b.	c.	●
8.	a.	●	c.	d.	28.	●	b.	c.	d.
9.	a.	b.	●	d.	29.	a.	●	c.	d.
10.	a.	●	c.	d.	30.	●	b.	c.	d.
11.	a.	b.	●	d.	31.	a.	b.	●	d.
12.	a.	●	c.	d.	32.	a.	b.	●	d.
13.	a.	b.	●	d.	33.	a.	b.	●	d.
14.	●	b.	c.	d.	34.	●	b.	c.	d.
15.	a.	●	c.	d.	35.	a.	b.	c.	●
16.	a.	b.	c.	●	36.	a.	b.	●	d.
17.	a.	b.	c.	●	37.	a.	b.	●	d.
18.	a.	b.	●	d.	38.	a.	b.	●	d.
19.	a.	b.	c.	●	39.	a.	●	c.	d.
20.	a.	b.	●	d.	40.	●	b.	c.	d.

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2007 FRM Practice Exam I
Answers & Explanations

1. Under the Advanced Measurement Approach for operational risk of Basel II, which of the following may be used for measuring operational risk?

I. Scorecard approach
II. Historical loss experience data
III. Standardized Alternative Approach
IV. Scenario analysis

a. I, II and IV only
b. II and III only
c. III and IV only
d. III only

CORRECT: A

The Scorecard approach, historical loss experience data and scenario analysis can all be used to measure operational risk under the Advanced Measurement Approach. The Standardized Alternative approach is a different operational risk capital calculation method.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

2. Consider a portfolio with 40% invested in asset X and 60% invested in asset Y. The mean and variance of return on X are 0 and 25 respectively. The mean and variance of return on Y are 1 and 121 respectively. The correlation coefficient between X and Y is 0.3. What is the nearest value for portfolio volatility?

a. 9.51%
b. 8.60%
c. 13.38%
d. 7.45%

CORRECT: D

The portfolio volatility is calculated as follows:

$$\text{portfolio variance} = w_x^2\sigma_x^2 + w_y^2\sigma_y^2 + 2w_x w_y \rho_{xy}\sigma_x\sigma_y$$

$$= 0.4^2 * 25 + 0.6^2 * 121 + 2 * 0.4 * 0.6 * 0.3 * 5 * 11$$

$$= 55.48$$

$$\text{portfolio volatility} = (\text{portfolio variance})^{0.5} = (55.48)^{0.5} = 7.45$$

Reference: Philippe Jorion, Value at Risk, 3rd edition. Chapter 7.

INCORRECT: A
This solution incorrectly calculates the portfolio variance using w_x and w_y instead of w_x^2 and w_y^2.
INCORRECT: B

This solution incorrectly omits the correlation between X and Y in the portfolio variance calculation.
INCORRECT: C
This solution incorrectly omits the weighting terms in the portfolio variance calculation.

3. A fund manager has a USD 100 million portfolio with a beta of 0.75. The manager has bullish expectations for the next couple of months and plans to use futures contracts on the S&P500 to increase the portfolio´s beta to 1.8. Given the following information, which strategy should the fund manager follow.

- The current level of the S&P index is 1250
- Each S&P futures contract delivers USD 250 times the index
- The risk-free interest rate is 6% per annum

a. Enter into a long position of 323 S&P futures contracts
b. Enter into a long position of 336 S&P futures contract
c. Enter into a long position of 480 S&P futures contracts
d. Enter into a short position of 240 S&P futures contracts

CORRECT: B

Since the desired beta (1.8) is greater than the current beta (0.75), a long position in S&P futures contracts is needed. The number of contracts needed is:

(β - β) * Portfolio_Value / Futures_Value = (1.8 - 0.75) * 100,000,000 / (1250 * 250)*

= 336 contracts.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 3.

INCORRECT: A
Since the desired beta (Beta) is greater than the current beta (Beta), the number of S&P futures contracts is:*
(Beta - Beta) * Portfolio_Value / Futures_Value.*
INCORRECT: C
This answer increases the portfolio beta to 2.25.
INCORRECT: D
This answer decreases the portfolio beta to 0.0.

4. A risk manager wants to recommend a reduction in firm-wide risk. To achieve that reduction, the firm has to cut some positions. She decides to cut her positions rapidly, but to minimize the cost of doing so, she chooses to leave intact her least liquid position. If the following is the list of her positions, which position would she not cut?

a. On-the-run US Treasuries
b. Exchange traded eurodollar futures contracts
c. Large cap listed equities
d. Rated benchmark corporate bonds

CORRECT: D

Rated benchmark corporate bonds would have the least amount of liquidity. On-the-run US Treasuries, exchange traded eurodollar futures contracts and large cap listed equities are highly liquid assets.

Reference: Christopher L. Culp, The Risk Management Process: Business Strategy and Tactics. Chapter 17.

5. Which of the following is not considered an event risk?

a. Legal risk
b. Business risk
c. Disaster risk
d. Reputation risk

CORRECT: B

Event risks can only create losses and are outside the control of the institution. Business risk is outside the control of the institution but is symmetrical, allowing for the creation of profits as well as losses. Being able to identify and mitigate event risks will reduce the firm's operational risk profile.

Reference: Philippe Jorion, Value at Risk, 3rd edition. Chapter 21.

6. The Markov property of stock prices is consistent with which form of market efficiency?

a. Constant
b. Semi-strong
c. Strong
d. Weak

CORRECT: D

The Markov process assumes that only the present value of a variable is relevant for predicting the future. The present value of the stock incorporates all past history. The probability distribution of the price at any future time is not dependent on the path followed by the stock price in the past. Competition ensures that this holds true.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 12.

INCORRECT: A
There is no constant form of market efficiency.
INCORRECT: B
The semi-strong form of market efficiency implies today's price of a stock reflects all public information about that stock, which is stronger than the Markov property which states that only the present value of a variable is relevant for predicting the future.
INCORRECT: C
The strong form of market efficiency implies today's price of a stock reflects all information about that stock, which is stronger than the Markov property which states that only the present value of a variable is relevant for predicting the future

7. One of your colleagues believes that risk management is driven by well-meaning regulators but it does not create economic value. Which of the following concepts would not be helpful to persuade him that risk management can create value for a firm?

a. Deadweight costs of financial distress and bankruptcy
b. Debt overhang mitigation
c. Homemade hedging for well-diversified shareholders
d. Tax rationale when income is taxed differently at different levels of income

CORRECT: C

Well-diversified investors are relatively unaffected by firm-specific events, and therefore risk management does not provide homemade hedging.

Reference: 6. René Stulz, Risk Management & Derivatives. Chapter 3.

INCORRECT: A
Risk management creates value by reducing deadweight costs.
INCORRECT: B
Risk management reduces the probability of future debt overhang which increases firm value.
INCORRECT: D
Risk management reduces taxes, particularly when income is taxed differently at different levels.

8. Which one of the following approaches/financial instruments can an originator use to transfer to a third party some of the risk of a securitization?

a. Sale of assets
b. Credit derivatives
c. Repurchase and sale agreements
d. Interest rate swaps

CORRECT: B

Credit derivatives (as well as the sale of subordinated tranches and Net Interest Margin bonds, and insurance and reinsurance) are a means of transferring the risk of a securitization.

Reference: Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management. Chapter 2.

INCORRECT: A
Sale of assets is not a means of transferring the risk of a securitization.
INCORRECT: C
Repurchase and sale agreements are not a means of transferring the risk of a securitization.
INCORRECT: D
Interest rate swaps are not a means of transferring the risk of a securitization.

9. Which of the following is not an area typically focused on by rating agencies when assigning credit ratings?

a. Competitive position of the firm in its industry
b. Management quality
c. Fairness of employee performance-based compensation
d. Financial policy of the firm

CORRECT: C

Although compensation schemes may be evaluated, the "fairness" of such schemes is not material consideration in the rating process.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 2.

INCORRECT: A
Rating agencies do focus on the competitive position of a firm in its industry.

INCORRECT: B
Rating agencies do focus on the management quality of a firm.
INCORRECT: D
Rating agencies do focus on the financial policy of a firm.

10. The Loss Distribution Approach (LDA) to operational risk uses historical information of operational loss events to determine capital calculations. Which of the following is not an advantage of using the LDA approach?

a. Results are based on the unique characteristics of each institution instead of relying on industry averages.
b. Results are forward-looking. Expected future results are reflected in the data.
c. Results are based on mathematical principals of term and level of confidence similar to those used for market and credit risk capital.
d. Results will evolve over time based on changes in the institutions loss experience.

CORRECT: B

With LDA, results may be backward-looking since some future risks would not be reflected in historical data.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

11. When can you use the Normal distribution to approximate the Poisson distribution, assuming you have "n" independent trials each with a probability of success of "p"?

a. When the mean of the Poisson distribution is very small.
b. When the variance of the Poisson distribution is very small.
c. When the number of observations is very large and the success rate is close to 1.
d. When the number of observations is very large and the success rate is close to 0.

CORRECT: C

*The Normal distribution can approximate the distribution of a Poisson random variable with a large lambda parameter (λ). This will be the case when both the number observations (n) is very large and the success rate (p) is close to 1 since λ = n*p.*

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 4.

INCORRECT: A
The mean of a Poisson distribution must be large to allow approximation with a Normal distribution.
INCORRECT: B
The variance of a Poisson distribution must be large to allow approximation with a Normal distribution.
INCORRECT: D
*The Normal distribution can approximate the distribution of a Poisson random variable with a large lambda parameter (λ). But since λ = n*p, where n is the number observations and p is the success rate, λ will not be large if p is close to 0.*

12. Diseconomies of scale imply that:

a. As the output of a financial institution increases, average costs of production decrease.
b. Small financial institutions are more cost efficient than large ones.
c. Small financial institutions do not prosper in a freely competitive environment.
d. Revenues derived from major technological investments fail to cover development costs providing a distinct advantage to smaller financial institutions.

CORRECT: B

Diseconomies of scale imply that as the output of a financial institution increases, its average costs of production increase. In general larger institutions have an advantage over smaller institutions simply due to their size and potential efficiencies when trying to recoup the cost of large technology expenditures. In this case, if a smaller institution has an advantage, it is considered a diseconomy of scale.

Reference: Anthony Saunders. Financial Institutions Management, 5th ed. Chapter 14.

INCORRECT: A
This answer relates to economies of scale, not diseconomies of scale.
INCORRECT: C
In a diseconomy of scale situation, smaller financial institutions will prosper as they would be considered more cost efficient than larger financial institutions
INCORRECT: D
If revenues fail to recover costs, it is deemed bad no matter if the financial institution is small or large.

13. There are 10 bonds in a credit default swap basket. The probability of default for each of the bonds is 5%. The probability of any one bond defaulting is completely independent of what happens to the other bonds in the basket. What is the probability that exactly one bond defaults?

a. 5%
b. 50%
c. 32%
d. 3%

CORRECT: C

The probability of exactly one default is:

$$10 * (0.05)^1 * (1 - 0.05)^9 = 32\%$$

One particular bond defaults and the other nine do not with probability $0.05 * 0.95^9$, and there 10 different ways this can happen.

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 1.

INCORRECT: A
This is simply the probability that any individual bond defaults.
INCORRECT: B
This is simply 10 times the probability that any individual bond defaults.
INCORRECT: D
One particular bond defaults and the other nine do not with probability $0.05 * 0.95^9 = 3\%$, but there 10 different ways this can happen

14. Which of the following statements is correct when comparing the differences between an interest rate swap and a currency swap?

a. At maturity, there is no exchange of principal between the counterparties in interest rate swaps and there is an exchange of principle in currency swap transactions.
b. At maturity, there is no exchange of principal between the counterparties in currency swaps and there is an exchange of principle in interest rate swap transactions.
c. The counterparties in a interest rate swap need to consider fluctuations in exchange rates, while currency swap counterparties are only exposed to fluctuations in interest rates.
d. Currency swap counterparties are exposed to less counterparty credit risk due to the offsetting effect of currency risk and interest rate risk embedded within the transaction.

CORRECT: A

Counterparties in currency swaps exchange the full principal amount stated in the transaction agreement. Counterparties in interest rate swaps exchange only the amount of gain/loss in the transaction.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 7.

INCORRECT: B
Counterparties in currency swaps exchange the full principal amount stated in the transaction agreement. Counterparties in interest rate swaps exchange only the amount of gain/loss in the transaction.
INCORRECT: C
Interest rate swap counterparties need to consider fluctuations in interest rates; currency swap counterparties need to consider fluctuations in interest rates and exchange rates.
INCORRECT: D
Currency swap counterparties not exposed to less counterparty credit risk.

15. Assuming the stock price and all other variables remain the same what will be the impact of an increase in the risk-free interest rate on the price of an American put option?

a. No impact.
b. Negative.
c. Positive.
d. Cannot be determined.

CORRECT: B

As interest rates increase, investors require higher expected returns from stocks and the present value of future payoffs decreases. These two effects decrease the value of a put option.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 9.

INCORRECT: A
Interest rate changes do impact the value of a put option.
INCORRECT: C
As interest rates increase, investors require higher expected returns from stocks and the present value of future payoffs decreases. These two effects decrease the value of a put option.
INCORRECT: D
The value of a put option changes monotonically with increases in the interest rate.

16. The payoff to a swap where the investor receives fixed and pays floating can be replicated by all of the following except:

a. A short position in a portfolio of FRAs.
b. A long position in a fixed rate bond and a short position in a floating rate bond.
c. A short position in an interest rate cap and a long position in an interest rate floor.
d. A long position in a floating rate note and a short position in an interest rate floor.

CORRECT: D

The payoff to a swap where the investor receives fixed and pays floating could not be replicated by a long position in a floating rate note and a short position in an interest rate floor, since an investor in a long position in a floating rate note would receive floating and an investor in a short position in an interest rate floor would pay fixed.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 7.

INCORRECT: A
The payoff to a swap where the investor receives fixed and pays floating could be replicated by a short position in a portfolio of forward rate agreements.
INCORRECT: B
The payoff to a swap where the investor receives fixed and pays floating could be replicated by a long position in a fixed rate bond and a short position in a floating rate bond.
INCORRECT: C
The payoff to a swap where the investor receives fixed and pays floating could be replicated by a short position in an interest rate cap and a long position in an interest rate floor.

17. All other things being equal, which of the following would you expect to increase the yield-to-maturity (YTM) of a corporate bond ?

I. An increase in the risk-free interest rate
II. An increase in the company's business risk
III. An increase in the company's leverage ratio

a. III only
b. I and II only
c. I and III only
d. I, II and III

CORRECT: D

As the risk-free rate increases, the yield on a corporate bond would increase. Similarly, as the probability of default increases (as would happen with either an increase in the company's business risk or an increase in its leverage ratio), the yield on that company's bonds would increase.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 3.

INCORRECT: A
An increase in the company's leverage ratio is not the only event that would increase the yield-to-maturity of a corporate bond.
INCORRECT: B
An increase in the risk-free rate and an increase in the company's business risk are not the only events that would increase the yield-to-maturity of a corporate bond.
INCORRECT: C
An increase in the risk-free rate and an increase in the company's leverage ratio are not the only events that would increase the yield-to-maturity of a corporate bond.

18. Which of the following are key input variables in the CreditRisk+ model?

a. Asset return volatilities and asset return correlations.
b. Recovery factors and spread curves.
c. Standard deviation of default rates and recovery rates.
d. Default correlations and the credit quality of obligors.

CORRECT: C

The input variables in CreditRisk+ are the default rates and their volatilities, exposures and recovery rates.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 6.

INCORRECT: A
CreditRisk+ assumes that the variability of the default rates is caused by systematic factors to which the portfolio is exposed, and not because of asset correlations.
INCORRECT: B
Spread curves are not an input to the CreditRisk+ model.
INCORRECT: D
CreditRisk+ makes no assumptions on the causes of default (credit quality of obligors is not an input, instead average default rates are used).

19. Which one of the following statements is incorrect regarding the properties of volatility smiles?

a. One possible reason for the smile in equity options is that people are concerned about stock market crashes.
b. Referring to the volatility smile of foreign currency options, implied volatility of at-the-money options is relatively low and it becomes higher for the deep in-the-money options and deep out-of-the-money options.
c. A volatility smile in foreign currency options exists because traders think that the lognormal distribution underestimates the likelihood of an extreme exchange rate movement.
d. The implied volatility of equity options increases as the strike price increases.

CORRECT: D

This statement is false. Generally, the implied volatility of equity options decreases as the stock price increases.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 16.

INCORRECT: A
This statement is true. Particularly since the 1987 crash, market declines have produced more pronounced volatility skews, suggesting that "crashphobia" is one reason for volatility smiles.
INCORRECT: B
This statement is true. The implied distribution for foreign currency options is more peaked with heavier tails than the assumed lognormal distribution, which means implied volatility increases as the strike price moves away from the exchange rate.
INCORRECT: C
This statement is true. The implied distribution for foreign currency options is more peaked with heavier tails than the assumed lognormal distribution, which means implied volatility increases as the strike price moves away from the exchange rate.

20. Consider a 2-year, 6% semi-annual coupon bond currently yielding 5.2% on a bond equivalent basis. If the Macaulay Duration of the bond is 1.92 years, its Modified Duration is closest to:

a. 1.97 years
b. 1.78 years
c. 1.87 years
d. 2.04 years

CORRECT: C

Let m be the compounding frequency. The modified duration is calculated as follows:

*Macaulay Duration = Modified Duration * (1 + y/m)*
*1.92 = Mod. Dur. * (1 + 0.052/2) = Mod. Dur. * 1.026*

Therefore, Modified Duration = 1.92 / 1.026 = 1.87 years.

Reference: Bruce Tuckman, Fixed Income Securities, 2th ed. Chapter 6.

INCORRECT: A
This answer incorrectly uses (1 - y/m) in the formula above.
INCORRECT: B
INCORRECT: D
This answer incorrectly uses (1 - y/m) in the formula above, sets y to 0.06 (0.052 is correct) and sets m to 1 (2 is correct).

21. There are several approaches to forecasting operational risk losses. Which of the following alternatives cannot be used to forecast a typical operational loss?

a. GARCH models
b. Factor-based models
c. Loss scenario models
d. Statistical/Actuarial models

CORRECT: A

GARCH models forecast volatility where the variance rate follows a mean-reverting process.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

INCORRECT: B
Loss scenario models are used to forecast operational losses.
INCORRECT: C
Statistical/actuarial models are used to forecast operational losses.
INCORRECT: D
Factor-based models are used to forecast operational losses.

22. Which of the following is not a standard practice used in the derivatives market to reduce credit risk among counterparties?

a. Adopting a master netting agreement
b. Agreeing to material adverse change covenants
c. Using initial and variation margin agreements
d. Including rating downgrade triggers in credit agreements

CORRECT: B

Using Material adverse change requirements is not a standard practice. Downgrade triggers are a common practice used within the industry to mitigate credit risk with counterparties, as are master netting agreements and initial and variation margin agreements.

Reference: 4. Ashish Dev, Economic Capital. Chapter 7.

INCORRECT: A
Master netting agreements are a common practice used within the industry to mitigate credit risk with counterparties.
INCORRECT: C
Initial and variation margin agreements are a common practice used within the industry to mitigate credit risk with counterparties.
INCORRECT: D
Downgrade triggers are a common practice used within the industry to mitigate credit risk with counterparties.

23. Which of the following divisions of a large multi-national bank would typically have the highest market risk?

a. Investment banking
b. Treasury management
c. Private banking
d. Retail brokerage

CORRECT: B

Treasury management faces high market risk since any unfavorable market movement is absorbed directly by the company.

Reference: Anthony Saunders, Financial Institutions Management, 5th ed. Chapter 10.

INCORRECT: A
Investment banking is primarily exposed to credit risk of default, such as a bad loan.
INCORRECT: C
Private banking is primarily exposed to operational risk and takes no market risk since it act as agents for investors.
INCORRECT: D
Retail brokerage is primarily exposed to operational risk and takes no market risk since it act as agents for investors.

24. • The two-year risk-free rate in the United Kingdom is 8% per annum, continuously compounded
• The two-year risk-free rate in France is 5% per annum, continuously compounded
• The current French Franc to the GBP currency exchange rate is that one unit of GBP currency costs 0.75 units of French Franc's

If the observed two-year forward price of one unit of the GBP is 0.850 units of the French Franc, what is your strategy to make an arbitrage profit?

a. Borrow GBP, buy French Francs and enter a short forward contract on French Francs.
b. Borrow GBP, buy French Francs, and enter a short forward contract on GBP.
c. Borrow French Francs, buy GBP, and enter a short forward contract on French Francs.
d. Borrow French Francs, buy GBP, and enter a short forward contract on GBP.

CORRECT: D

*Borrowing 1 FF means in two years we owe exp(0.05 * 2) FF, which is 1.11 FF.*

*Converting the FF today gives 1.33 GBP which grows to 1.33 exp(0.08 * 2) GBP in two years.*

*Entering a short forward contract on GBP means the 1.33 exp(0.08 * 2) GBP is exchanged for (1.33 exp(0.08 * 2) * 0.85) FF, which is 1.32 FF. Since 1.11 FF is owed, this strategy guarantees a profit.*

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 4.

INCORRECT: A
*Borrowing 1 GBP means in two years we owe exp(0.08 * 2) GBP, which is 1.17GBP. Converting the GBP today gives 0.75 FF which grows to 0.75 exp(0.05 * 2) FF in two years. Entering a short forward contract on FF means the 0.75 exp(0.05 * 2) FF is exchanged for (0.75 exp(0.05 * 2) * (1/0.85)) GBP, which is 0.98 GBP. Since 1.17 GBP is owed, this strategy guarantees a loss.*
INCORRECT: B
This strategy does not guarantee a profit.
INCORRECT: C
This strategy does not guarantee a profit.

25. Which of the following is not an advantage of the Loss-Scenario Model (LSM) in operational risk?

a. LSM's may be useful in identifying the weaknesses of a particular strategy.
b. LSM's may be useful in identifying the need for recovery planning and crisis management.
c. LSM's may be useful in aggregating scenarios into a complete picture of operational risk of the firm.
d. LSM's may be useful as they are intuitively attractive and easy to comprehend.

CORRECT: C
In LSM, scenarios are not completely defined and exclusive. Therefore it may not be possible to aggregate them.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

INCORRECT: A
LSM can help identify strategy weaknesses.
INCORRECT: B
LSM can help identify recovery planning and crisis management needs.
INCORRECT: D
LSM are typically easy to comprehend.

26. Let Z be a standard normal random variable. An event X is defined to happen if either z takes a value between –1 and 1 or z takes any value greater than 1.5. What is the probability of event X happening if N(1) = 0.8413, N(0.5) = 0.6915 and N(-1.5) = 0.0668, where N() is the cumulative distribution function of a standard normal variable?

a. 0.083
b. 0.2166
c. 0.6826
d. 0.7494

CORRECT: D

Let A be the event that z takes a value between 1 and –1 and B be the event that z takes a value greater than 11/2 . The probability of z being between 1 and –1 is the area under the standard normal curve between 1 and -1. From the properties of a standard normal distribution, we know that:

$$N(-1) = 1.0 - N(1) = 1.0 – 0.8413 = 0.1587$$

Therefore, the probability of z being between 1 and –1 = P(A) = N(1) - N(-1) = 0.6826
The probability of z being greater than 11/2 = P(B) = 1 - N(11/2) = N(-11/2) = 0.0668
Event X = A U B and P(X) = P(A) + P(B) since A and B are mutually exclusive.
Hence, P(X) = 0.7494

Reference: Spiegel et al., Probability and Statistics, Schaum's Outlines, 2nd Edition – Chapter 1 (Page 13), Chapter 3 (Page 114)

INCORRECT: A
This solution is the probability that z is between 0.5 and 1 and not less than 1.5.
0.0830 = Prob(z <= 1.0) - Prob(z <= 0.5) - Prob(z <= -1.5) = N(1) - N(0.5) - N(-1.5)
The question wants the probability that z is between -1 and 1 or greater than 1.5.
INCORRECT: B
This solution is the probability that z is between 0.5 and 1 or greater than 1.5.
0.2166 = Prob(z <= 1.0) - Prob(z <= 0.5) + Prob(z > 1.5) = N(1) - N(0.5) + N(-1.5)
The question wants the probability that z is between -1 and 1 or greater than 1.5.
INCORRECT: C
This solution is only the probability that z is between -1 and 1.

27. Which of the following is not a feature of CreditMetrics?

a. It takes a portfolio approach to measuring credit risk.
b. It handles correlations across credit exposures.
c. It handles migration risk.
d. It handles full defaults but not partial defaults and/or recoveries.

CORRECT: D

The CreditMetrics approach does not consider partial defaults or recoveries. Default is assumed to be an "absorbing state", meaning once a company goes into default, it stays there.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 6.

INCORRECT: A
CreditMetrics is a set of analytic methods for measuring portfolio credit risk.
INCORRECT: B
CreditMetrics does incorporate the correlation between credit exposures.
INCORRECT: C
The CreditMetrics approach to measuring portfolio credit risk is driven by consideration of ratings changes.

28. For a company starting with rating B in year 1, calculate the default (rating D) probability for year 2.

Starting	Ending			
	A	B	C	D
A	0.98	0.02	0.00	0.00
B	0.12	0.86	0.02	0.00
C	0.00	0.05	0.75	0.20
D	0.00	0.00	0.00	1.00

a. 0.40%
b. 2.00%
c. 17.20%
d. 65.00%

CORRECT: A

The default probability for year two is the sum of the probabilities of all the possible paths a company could take to default in year 2 starting with rating B in year 1.

Default probability for year 2 = $P(D_2 \mid A_1) * P(A_1 \mid B_0) + P(D_2 \mid B_1) * P(B_1 \mid B_0) + P(D_2 \mid C_1) * P(C_1 \mid B_0) = 0 + 0 + 0.02 * 0.20 = 0.4\%$.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 3.

INCORRECT: B
The default probability for year two is the sum of the probabilities of all the possible paths a company could take to default in year 2 starting with rating B in year 1.
INCORRECT: C
The default probability for year two is the sum of the probabilities of all the possible paths a company could take to default in year 2 starting with rating B in year 1.

This answer incorrectly calculates the default probability for year 2 as: $P(D_2 \mid C_1) * P(B_1 \mid B_0) = 0.2 * 0.86 = 0.172$ (that is, the company starts year 1 with rating B, ends year 1 with rating B, then starts year 2 with rating C and ends year 2 with rating D, which is not possible since the company must start year 2 with the same rating it ends year 1).
INCORRECT: D
The default probability for year two is the sum of the probabilities of all the possible paths a company could take to default in year 2 starting with rating B in year 1.

29. In determining an appropriate swap spread in a first-to-default swap consisting of a basket of underlying credits, how is correlation between the credits generally related to the final pricing of the swap spread?

a. Directly
b. Inversely
c. It does not come into effect.
d. It is difficult to say because correlations on credit risky assets are often impossible to calculate.

CORRECT: B

The more highly correlated the credits, the more likely that the same factor would cause their default. The less likely correlated the credits, the more likely that various factors would cause their default. The latter is the more risky scenario in that it is more difficult to assess and monitor the risk when there may be various factors contributing to it.

Reference: Gunter Meissner, Credit Derivatives. Chapter 2.

INCORRECT: A
As the correlation between credits decreases, the more likely that various factors could cause a default of any one of the underlying credits which is a more risky scenario.
INCORRECT: C
The correlation between credits does effect the pricing.
INCORRECT: D
The correlation between credits does effect the pricing.

30. Let X and Y be two random variables representing the annual returns of two different portfolios. If E[X] = 3, E[Y] = 4 and E[XY] = 11, then what is Cov[X, Y]?

a. -1
b. 0
c. 11
d. 12

CORRECT: A

$$Cov[X,Y] = E[XY] - E[X] * E[Y] = 11 - 3 * 4 = -1$$

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan. Probability and statistics, Schaum's Outline, 2nd ed. Chapter 3.

31. Based upon historical migration tables published by public debt rating agencies, which of the following statements is true?

a. We should expect to see the greatest amount of credit rating stability over long periods of time (e.g., ten-years). Credit ratings will tend to change more during shorter periods of time.
b. We should expect to see credit ratings change by about the same amount over time. The ratings transition matrix shows approximately the same figures for the one-year, five-year, and ten-year time horizons.
c. We should expect to see the highest level of rating stability during the one-year timeframe. This stability will decline at both the five-year time frame and even more so at the ten-year horizon.
d. We should expect to see the highest level of rating stability in the intermediate term (five-year time frame). Risk ratings will tend to have changed more at both the one-year and ten-year horizons.

CORRECT: C

The Rating Transition Matrix tables show that credit ratings are their most stable over a one year horizon and that stability decreases with longer horizons.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 2.

INCORRECT: A
The Rating Transition Matrix tables show that credit ratings are their most stable over a one year horizon.
INCORRECT: B
The Rating Transition Matrix tables show that credit rating stability changes significantly over different horizons.
INCORRECT: D
The Rating Transition Matrix tables show that credit ratings are their most stable over a one year horizon.

32. Which of the following statements about American stock options is false?

a. American options can be exercised at or before maturity.
b. American options are always worth at least as much as European options.
c. American options can easily be valued with Monte Carlo simulation.
d. American options can be easily valued with binomial trees.

CORRECT: C

Since simulation methods cannot account for the possibility of early exercise, Monte Carlo simulation cannot easily value American options.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 8.

INCORRECT: A
This statement is true - American options can be exercised at or before maturity.
INCORRECT: B
This statement is true - since one can hold an American option to maturity (and thereby replicate a European option), an American option is always at least as valuable as a European option.
INCORRECT: D
This statement is true - binomial trees can be used to value American options.

33. Which of the following is (are) true regarding the Black-Scholes model?

I. The Black-Scholes model assumes that stock returns are lognormally distributed.
II. The Black-Scholes model assumes that stocks are continuously traded.
III. The Black-Scholes model assumes that the risk-free interest rate is constant and the same for all maturities.

a. I only
b. III only
c. II and III
d. I, II and III

CORRECT: C

The Black-Scholes model does assume that stocks are continuously traded and that the risk-free interest rate is constant and the same for all maturities.
Further, the Black-Scholes model assumes that stock returns are normally distributed; stock prices are assumed to be lognormally distributed.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 13.

INCORRECT: A
The Black-Scholes model assumes that stock prices are lognormally distributed, and stock returns are normally distributed.
INCORRECT: B
The Black-Scholes model does assume that the risk-free interest rate is constant and the same for all maturities, but this is not the only true statement
INCORRECT: D
The Black-Scholes model assumes that stock prices are lognormally distributed, and stock returns are normally distributed.

34. When evaluating asset-backed securitization issues, which of following would be least important during the investor's analysis process?

a. The liability concentration levels of the asset originator.
b. The structure of the underlying securitization transaction.
c. The quality of the loan servicer for the underlying assets in the transaction.
d. The quality of the underlying assets within the securitization structure.

CORRECT: A

Virtually anything to do with the issuer is important, but in the order of priority, looking at the issuer's liability concentrations, assuming you could obtain that information, is not as important as the other three alternatives. Although the liability concentration levels are a very significant issue for the underlying originator to monitor and analyze, this is not a significant consideration for investors to review.

Reference: Gunter Meissner, Credit Derivatives. Chapter 2.

INCORRECT: B
The structure of the underlying securitization transaction would be important in evaluating asset-backed securitization issues.
INCORRECT: C
The quality of the loan servicer for the underlying assets in the transaction would be important in evaluating asset-backed securitization issues.

INCORRECT: D
The quality of the underlying assets would be important in evaluating asset-backed securitization issues.

35. Which of the following are critical prerequisites to successfully implementing an operational risk indicator program within an organization?

I. The firm needs to be able to identify risk profiles at various levels within the organization.
II. Involvement of line managers in developing the risk indicators
III. Availability of a meaningful data pool (for example, transaction volume, financial data, efficient data collection processes and procedures)

a. I and III only
b. I and II only
c. II and III only
d. I, II and III

CORRECT: D

All of the statements are true.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

36. A bright quantitative analyst in your risk management department has developed a new risk measure that promises to be applicable to a wide set of risks across your firm. As a first step in your evaluation, you ask the analyst to demonstrate that it is a coherent risk measure. The results are listed below. Which equation shows that it is not a coherent risk measure?

Given:
• x and y are state-contingent payoffs of two different portfolios
• p(x) and p(y) are the risk measures of the two portfolios respectively
• a and b are arbitrary constants (with a > 0)
• r is the risk-free rate

a. $p(x + y) \leq p(x) + p(y)$
b. $p(ax) = ap(x)$
c. $p(x) \leq p(y)$ if $x \leq y$
d. $p(x + b(1 + r)) = p(x) – b$

CORRECT: C

This demonstrates that the risk measure does not satisfies the monotonicity property. Monoticity property requires that: $p(x) \geq p(y)$.

Reference: Philippe Jorion, Value At Risk, 3rd ed. Chapter 5.

INCORRECT: A
This demonstrates that the risk measure satisfies the subadditivity property.
INCORRECT: B
This demonstrates that the risk measure satisfies the homogeneity property.
INCORRECT: D
This demonstrates that the risk measure satisfies the risk-free condition property.

37. A CDO, consisting of three tranches, has an underlying portfolio of n corporate bonds with a total principal of USD N million. Tranche 1 has 10% of N and absorbs the first 10% of the default losses. Tranche 2 has 20% of N and absorbs the next 20% of default losses. The final Tranche 3 has 75% of N and absorbs the residual default loss. Which of the following statements are true?

I. Tranche 2 has the highest yield
II. Tranche 1 is usually called "Toxic Waste"
III. Tranche 3 would typically be rated as AAA by S&P
IV. Tranche 3 has the lowest yield

a. I only
b. IV only
c. II, III and IV only
d. II and IV only

CORRECT: C

Since Tranche 1 absorbs the first default losses, this tranche is commonly referred to as "toxic waste" (II). Since Tranche 3 is the most protected from losses, this tranche would have the highest rating by S&P (typically AAA) (III) but would also have the lowest yield (IV).

Since Tranche 1 is the most risky, Tranche 1 has the highest yield, not Tranche 2 (I).

Reference: Gunter Meissner, Credit Derivatives. Chapter 3.

INCORRECT: A
Since Tranche 1 is the least protected from losses, Tranche 1 typically has the highest yield, not Tranche 2 (I).
INCORRECT: B
Since Tranche 3 is the most protected from losses, this tranche would have the lowest yield (IV). But this is not the only valid statement.
INCORRECT: D
Since Tranche 1 absorbs the first default losses, this tranche is commonly referred to as "toxic waste" (II). Since Tranche 3 is the most protected from losses, this tranche would have the lowest yield (IV). But these are not the only valid statements.

38. A manager wants to swap a bond for a bond with the same price but higher duration. Which of the following bond characteristics would be associated with a higher duration?

I. A higher coupon rate
II. More frequent coupon payments
III. A longer term to maturity
IV. A lower yield

a. I, II and III
b. II, III and IV
c. III and IV
d. I and II

CORRECT: C

A higher coupon rate and more frequent coupon payments each decrease a bond's duration, so I and II would not be associated with higher duration. Longer term to

maturity and lower yield increase the bond's duration, given all other parameters remain the same.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 6.

INCORRECT: A
A higher coupon rate and more frequent coupon payments each decrease a bond's duration, so I and II would not be associated with higher duration.
INCORRECT: B
More frequent coupon payments decreases a bond's duration, so II would not be associated with higher duration.
INCORRECT: D
A higher coupon rate and more frequent coupon payments each decrease a bond's duration, so I and II would not be associated with higher duration.

39. Which of the following statements is/are true?

I. In an add-up basket credit default swap, the pay-off occurs only when all reference entities default.
II. In a binary credit default swap, the payoff in the event of default is a fixed dollar amount.
III. In a total rate of return swap, the buyer of credit risk passes on any appreciation in the value of the underlying asset to the seller of credit risk.

a. I only
b. II only
c. I and II
d. II and III

CORRECT: B

The payoff in a binary credit default swap is a fixed dollar amount (II).

An add-up basket credit default swap provides a payoff when any of the reference entities default, not when all reference entities default (I), and it is the seller of credit risk, not the buyer (III), who passes on any appreciation in the value of the underlying asset to the buyer of credit risk.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: A
An add-up basket credit default swap provides a payoff when any of the reference entities default, not when all reference entities default (I).
INCORRECT: C
The payoff in a binary credit default swap is a fixed dollar amount (II), but an add-up basket credit default swap provides a payoff when any of the reference entities default, not when all reference entities default (I).
INCORRECT: D
The payoff in a binary credit default swap is a fixed dollar amount (II), but it is the seller of credit risk, not the buyer (III), who passes on any appreciation in the value of the underlying asset to the buyer of credit risk.

40. Which of the following statement(s) is/are TRUE?

I. The scale parameter in Extreme Value Theory measures the speed at which the tail disappears
II. The shape parameter for empirical stock market data has a higher value than that of the normal distribution
III. Normal distribution tails drop more slowly than for the empirical distribution for financial returns
IV. As the confidence level increases, the use of the Central Limit Theorem leads to an overestimate of the potential loss

a. II only
b. I and III only
c. II and III only
d. III and IV only

CORRECT: A

The shape parameter in EVT for empirical stock market data is between 0.2 and 0.4, whereas the shape parameter for a normal distribution is 0.

However, the shape parameter (not the scale parameter) measures the speed at which the tail disappears, normal distribution tails drop more quickly than the empirical distribution for financial returns, and as the confidence level increases, the Central Limit Theorem underestimates potential losses.

Reference: Lampros Kalyvas and Ioannis Akkizidis, Integrated Market, Credit and Operational Risk. Chapter 4.

INCORRECT: B
The shape parameter (not the scale parameter) measures the speed at which the tail disappears and normal distribution tails drop more quickly than the empirical distribution for financial returns.
INCORRECT: C
The shape parameter in EVT for empirical stock market data is between 0.2 and 0.4, whereas the shape parameter for a normal distribution is 0.
However, normal distribution tails drop more quickly than the empirical distribution for financial returns, and as the confidence level increases.
INCORRECT: D
Normal distribution tails drop more quickly than the empirical distribution for financial returns, and as the confidence level increases, the Central Limit Theorem underestimates potential losses.

End of 2007 FRM Practice Exam I
Answers & Explanations

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2007 FRM Practice Exam II
Candidate Answer Sheet

41.	a.	b.	c.	d.	61.	a.	b.	c.	d.
42.	a.	b.	c.	d.	62.	a.	b.	c.	d.
43.	a.	b.	c.	d.	63.	a.	b.	c.	d.
44.	a.	b.	c.	d.	64.	a.	b.	c.	d.
45.	a.	b.	c.	d.	65.	a.	b.	c.	d.
46.	a.	b.	c.	d.	66.	a.	b.	c.	d.
47.	a.	b.	c.	d.	67.	a.	b.	c.	d.
48.	a.	b.	c.	d.	68.	a.	b.	c.	d.
49.	a.	b.	c.	d.	69.	a.	b.	c.	d.
50.	a.	b.	c.	d.	70.	a.	b.	c.	d.
51.	a.	b.	c.	d.	71.	a.	b.	c.	d.
52.	a.	b.	c.	d.	72.	a.	b.	c.	d.
53.	a.	b.	c.	d.	73.	a.	b.	c.	d.
54.	a.	b.	c.	d.	74.	a.	b.	c.	d.
55.	a.	b.	c.	d.	75.	a.	b.	c.	d.
56.	a.	b.	c.	d.	76.	a.	b.	c.	d.
57.	a.	b.	c.	d.	77.	a.	b.	c.	d.
58.	a.	b.	c.	d.	78.	a.	b.	c.	d.
59.	a.	b.	c.	d.	79.	a.	b.	c.	d.
60.	a.	b.	c.	d.	80.	a.	b.	c.	d.

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2007 FRM Practice Exam II
Questions

41. A company has been offered a USD 5 million term loan to be fully repaid only at maturity 2 years later. The bank estimates that it will recover only 55% of its exposure if the borrower defaults and that the likelihood of that happening is 0.1%. What is the bank's expected loss one year later?

a. USD 2,750
b. USD 2,250
c. USD 1,375
d. USD 1,125

42. Which of the following regarding corporate bond credit spreads is true?

I. The credit spread is approximately equal to a default probability times the fractional recovery rate plus a risk premium
II. Corporate bonds with lower credit ratings will have a larger credit spread
III. Credit spreads may not include liquidity premium components
IV. The non-taxable status of Treasury coupon payments helps to decrease the credit spread

a. II only
b. I and II only
c. I and III only
d. I and IV only

43. In Altman's credit-classification model, the higher the discriminant function value (Z-score):

a. The lower the default risk of the borrower.
b. The higher the default risk of the borrower.
c. The lower the recovery rate from debt instruments.
d. The Z-score indicates neither the default risk of the borrower nor the recovery rate of debt instruments.

44. As the CRO of a firm specializing in mortgage-backed securities, you have been asked to explain how Interest-Only strips and Principal-Only strips would react if interest rates change. A portfolio manager is considering two types of mortgage derivative products for investment: Interest-Only strips (IO) and Principal-Only strips (PO). Which of the following is TRUE ?

a. When interest rates fall, both Principal-Only and Interest-Only strips will increase in value.
b. When interest rates fall, Principal-Only strips will increase in value, Interest-Only strips decrease in value.
c. When interest rates rise, Principal-Only strips will increase in value, Interest-Only strips decrease in value.
d. When interest rates rise, only both Principal-Only and Interest-Only strips will increase in value.

45. Company ABC was incorporated on January 1, 2004. It has an expected annual default rate of 10%. Assuming a constant quarterly default rate, what is the probability that company ABC will not have defaulted by April 1, 2004?

a. 2.40%
b. 2.50%
c. 97.40%
d. 97.50%

46. You are given the following information about the returns of stock P and stock Q:

- Variance of return of stock P = 100.0
- Variance of return of stock Q = 225.0
- Covariance between the return of stock P and the return of stock Q = 53.2

At the end of 1999, you are holding USD 4 million in stock P. You are considering a strategy of shifting USD 1 million into stock Q and keeping USD 3 million in stock P. What percentage of risk, as measured by standard deviation of return, can be reduced by this strategy?

a. 0.50%
b. 5.00%
c. 7.40%
d. 9.70%

47. Which of the following statements about its methodology for calculating an operational risk capital charge in Basel II is correct?

a. Basic Indicator Approach is suitable for institutions with sophisticated operational risk profile.
b. Under the Standardized Approach, capital requirement is measured for each of the business line.
c. Advanced Measurement Approaches (AMA) will not allow an institution to adopt its own method of assessment of operational risk.
d. AMA is less risk sensitive than the Standardized Approach.

48. Which of the following credit risk models in Basel II attempts to recognize diversification effects through a granularity adjustment?

a. Standardized approach based on external credit ratings provided by external credit assessment institutions
b. Internal Rating Based approach using internal estimate of creditworthiness, subject to regulatory standards
c. Standardized approach based on internal portfolio credit risk model
d. All of the above.

48. Firm A decides not to apply hedge accounting for the fair value hedges on assets that they have in place. This decision would:

a. Increase the volatility of the firm's net asset position, but not affect cash flows.
b. Have no affect on the firm's net asset position.
c. Increase the volatility of the firm's net asset position and cash flows.
d. Increase the volatility of the firm's net asset position, but decrease the volatility of cash flows.

49. A relative value hedge fund manager holds a long position in Asset A and a short position in Asset B of roughly equal principal amounts. Asset A currently has a correlation with Asset B of .97. The risk manager decides to overwrite this correlation assumption in the variance-covariance based VAR model to a level of 0.30. What effect will this change in correlation from 0.97 to 0.30 have on the resulting VAR measure?

a. It increases VAR.
b. It decreases VAR.
c. It has no effect on VAR, but changes profit or loss of strategy.
d. Do not have enough information to answer.

50. Consider an A rated bond and a BBB rated bond. Assume that the one-year probabilities of default for the A and BBB rated bonds are 2% and 4%, respectively, and that the joint probability of default of the two bonds is 0.15%. What is the default correlation between the two bonds?

a. 0.07%
b. 2.60%
c. 93.00%
d. The default correlation cannot be calculated with the information provided.

51. Estimation or parameter risk is an example of:

a. Changing position risk
b. Dual inadequacy risk
c. Model risk
d. Stability risk

52. • The two-year risk-free rate in the United Kingdom is 8% per annum, continuously compounded
• The two-year risk-free rate in France is 5% per annum, continuously compounded
• The current French Franc to the GBP currency exchange rate is that one unit of GBP currency costs 0.75 units of French Franc's

What is the two-year forward price of one unit of the GBP in terms of the French Franc so that no arbitrage opportunity exists?

a. 0.578
b. 0.706
c. 0.796
d. 0.973

53. You have been asked to help communicate to business unit managers some practical considerations in developing key risk indicators (KRIs) and collecting data. Which of the following should not be on your list of talking points?

a. KRI definitions will consider the rationale for the risk indicator, description of the measurement criteria, and the sources of data.
b. KRIs must be continually validated and refined.
c. Select KRIs based on their data availability first and predictive value second.
d. Each KRI should be weighted in accordance with its significance, or predictive capabilities

54. Which of the following statements about the linear regression of the return of a portfolio over the return of its benchmark presented below are correct?

Portfolio parameter	Value
Beta	1.25
Alpha	0.26
Coefficient of determination	0.66
Standard deviation of error	2.42

I. The correlation is 0.71
II. 34% of the variation in the portfolio return is explained by variation in the benchmark return
III. The portfolio is the dependent variable
IV. For an estimated portfolio return of 12%, the confidence interval at 95% is [7.16%;16.84%]

a. II and IV
b. III and IV
c. I, II and III
d. II, III and IV

55. Which of the following statements are true?

I. To ensure higher effectiveness in managing operational risk, the operational risk manager's compensation should be linked to trader performance
II. Stop-loss limits are less effective as an operational risk measure than exposure limits because exposure limits consider future market risk movements while stop-loss limits are backward looking
III. As annual audits of listed entities are regulatory and mandatory by nature, they should not be seen as a material part of operational risk management
IV. The long option like feature of most traders' compensation packages substantially increases operational risk

a. I, III and IV
b. II and IV
c. II only
d. IV only

56. A 90-day European put option on Microsoft has an exercise price of $30. The current market price for Microsoft is $30. The delta for this call option is close to:

a. -1.0
b. -0.5
c. 0.5
d. 1.0

57. Credit derivatives are instruments used to trade credit risk. When an institution has sold exposure to another institution (i.e., purchased protection) in a credit default swap, it has exchanged the risk of default on the underlying asset for which of the following?

a. Default risk of the counterparty
b. Default risk of a credit exposure identified by the counterparty
c. Joint risk of default by the counterparty and of the credit exposure identified by the counterparty
d. Joint risk of default by the counterparty and the underlying asset

58. The S&P March 2005 index futures contract is trading at 280. The associated American 260 call option is at 16 and the associated 260 American put option is at 3. Which of the following strategies would you select to lock in a profit?

a. No strategy would result in a risk-free profit.
b. Buy the put, sell the call and buy the futures contract.
c. Buy and exercise the put and buy the futures contract.
d. Buy and exercise the call and sell the futures contract.

59. Which one of the following statements is incorrect regarding the margining of exchange-traded futures contracts?

a. Day trades and spread transactions require lower margin levels.
b. If an investor fails to deposit variation margin in a timely manner the positions may be liquidated by the carrying broker.
c. Initial margin is the amount of money that must be deposited when a futures contract is opened.
d. A margin call will be issued only if the investor's margin account balance becomes negative.

60. Which of the following is not a type of operational risk as defined by Basel II?

a. Human error and internal fraud
b. Destruction by fire or other external catastrophes
c. Damaged reputation due to a failed merger
d. Failure or breakdown in internal control processes

61. Consider the following linear regression model: Y = a + b*X + e. Suppose a = 0.05, b = 1.2, Std(Y) = 0.26, Std(e) = 0.1, what is the correlation between X and Y?

a. 0.923
b. 0.852
c. 0.701
d. 0.462

62. For a zero-coupon bond the probability of defaulting over the next year is 0.4% and the average (annualized) probability of defaulting over the next two years is 0.6%. What is the marginal probability of default during the second year assuming risk-neutral pricing?

a. 0.18%
b. 0.33%
c. 0.80%
d. 0.90%

63. Suppose JP Morgan Chase enters into a 5-year, USD 5 million, interest rate swap with Citibank. JP Morgan Chase will receive annual payments at a fixed rate of 8% and will make payments to Citibank based on 1-year LIBOR. Calculate the potential exposure to JP Morgan Chase in 1 year if the swap rate after 1 year is 11%.

a. USD +150,000
b. USD -150,000
c. 0
d. USD -550

64. Assume that a risk manager wants to calculate VAR for an S&P 500 futures contract using the historical simulation approach. The current price of the contract is 935 and the multiplier is 250. Given the historical price data shown below for the previous 300 days, what is the VAR of the position at 99% using the historical simulation methodology?

Returns: -6.1%, -6%, -5.9%, -5.7%, -5.5%, -5.1% …… 4.9%, 5%, 5.3%, 5.6%, 5.9%, 6%

a. USD 13,324
b. USD 13,791
c. USD 14,025
d. USD 14,259

65. Which of the following illustrates losses caused by Firm A's operational risk exposure?

I. After a surprise announcement by the central bank that interest rates would increase, bond prices fall and Firm A incurs a significant loss on its bond portfolio
II. The data capture system of Firm A fails to capture the correct market rates causing derivative trades to be done at incorrect prices, leading to significant losses
III. As a result of a workers strike the share price of a company that Firm A invested in falls significantly, causing major investment losses
IV. A counterparty of Firm A fails to settle their debt to Firm A and in doing this they are in breach of a legal agreement to pay for services rendered resulting in a material exposure

a. I, II and IV only
b. II only
c. II and III only
d. II, III and IV only

66. What are the key issues involved in the use of loss data for modeling operational risk?

I. External loss data can be easily incorporated into operational risk modeling to complement internal loss data
II. Most firms face significant problems in gathering sufficient relevant loss data
III. To obtain sufficient loss data, scenario analysis can be used to create data synthetically.
IV. Unlike external loss data, internal loss data collected over a long period of time do not need relevancy adjustments

a. I and III only
b. II and III only
c. I, II and III only
d. II, III and IV only

67. A risk manager believes that there is some probability that ABC Company's bond rating will be revised downward from A to A-. She wants to obtain an estimate of the change in value of the company's bond if such a change takes place. Which of the following approaches should she not use to estimate the impact of the rating change on the price of the company's bond?

a. Multiply the change in yield spread resulting from the rating change by the modified duration of the bond using the average yield to maturity or the option adjusted spread, by bond rating class.
b. Estimate the new forward curve after the rating change, compute the price of the bond using the new curve for the remaining cash flows, and compare that to the original bond price.
c. Empirically estimate historical price changes following a rating change on a large sample of bonds across different rating classes using an "event study" methodology.
d. Calculate the price change of the bond the last time a rating change occurred and use it as your estimate.

68. A portfolio manager holds a call option on a stock that does not pay dividends. Leaving for vacation, he wants to give instructions to his trader on when to exercise an option he purchased on that stock. When should the trader exercise the option?

a. After a better-than-expected quarterly report
b. Only when the exercise price is greater than the strike price
c. Only when the strike price is greater than the exercise price
d. Never

69. A sound risk management process would include which of the following primary components:

I. A comprehensive risk measurement approach
II. A detailed structure of limits
III. Guidelines and other parameters used to govern risk taking
IV. Strong risk management unit with a dual reporting relationship to the firm's head trader and chief risk officer

a. I, II and IV only
b. II, III and IV only
c. IV only
d. I, II and III only

70. The failure of Barings Bank is a typical example of a lack in control pertaining to which one of the following risks:

a. Liquidity Risk
b. Credit Risk
c. Operational Risk
d. Foreign exchange Risk

71. Which of the following statements about the delta-normal VaR methodology is NOT true?

a. It may underestimate the occurrence of large observations due to its reliance on a normal distribution.
b. It cannot account for non-linear effects such as those resulting from embedded options.
c. It is similar to historical simulation except that the movements in risk factors are generated by drawing from some distribution.
d. It is appropriate for allocating economic capital for a fixed-income desk unless it contains many bonds with embedded options.

72. A non-dividend-paying stock has a current price of $100 per share. You have just sold a six-month European call option contract on 100 shares of this stock at a strike price of $101 per share. You want to implement a dynamic delta hedging scheme to hedge the risk of having sold the option. The option has a delta of 0.50. You believe that delta would fall to 0.44 if the stock price falls to $99 per share.

- Identify what action you should take NOW (i.e., when you have just written the option contract) to make your position delta neutral
- After the option is written, if the stock price falls to $99 per share, identify what action should be taken at that time, i.e. LATER, to rebalance your delta-hedged position

a. NOW: buy 50 shares of stock, LATER: buy 6 shares of stock
b. NOW: buy 50 shares of stock, LATER: sell 6 shares of stock
c. NOW: sell 50 shares of stock, LATER: buy 6 shares of stock
d. NOW: sell 50 shares of stock, LATER: sell 6 shares of stock

73. An investor enters into a short position in a gold futures contract at USD 294.20. Each futures contract controls 100 troy ounces. The initial margin is USD 3,200, and the maintenance margin is USD 2,900. At the end of the first day, the futures price drops to USD 286.6. Which of the following is the amount is the variation margin at the end of the first day?

a. 0
b. USD 34
c. USD 334
d. USD 760

74. Hong Kong Shanghi Bank has entered into a repurchase agreement with a client where the client will sell a 10-year US treasury bond to the bank and repurchase it in 10 days. The bond has a notional value of USD 10m, trades at par with the yield volatility for a 10-year US treasury 0.074%. The swap's maximum potential exposure at a 99% confidence level is closest to:

a. USD 320,000
b. USD 380,000
c. USD 550,000
d. USD 1,200,000

75. Suppose X follows an AR(1) model: X(t) = 0.1 + 0.8*X(t-1) + e(t), where, E(e(t)) = 0. What is the long term mean of X?

a. 0.1250
b. 0.5000
c. 2.0000
d. 0.0000

76. A currency options trader enters into the following transactions:

- Buys a European-styled EUR call/YEN put option with a strike price of 132.05 maturing in 2 months
- Sells a European-styled EUR call/YEN put option with a strike price of 132.75 maturing in 1 month

By doing so, the trader effectively created a:

a. Bear spread on EUR/YEN
b. Bull spread on EUR/YEN
c. Diagonal spread on EUR/YEN
d. Reverse calendar spread on EUR/YEN

77. All of the following are different ways to structure credit enhancement in support of a securitization except:

a. Cash reserve account
b. Subordinated tranches of securitized debt
c. Collateralization
d. Excess spread

78. A first-to-default basket credit default swap is a credit derivative that:

a. Entails a number of reference entities and provides a payoff only when the first reference entity defaults.
b. Entails a number of reference entities and provides a payoff only when the first entity's recovery rate is higher than the rest of the entities in the swap.
c. Provides a payoff when the first entity of the credit default swap issues securities.
d. Provides a payoff when the first entity of the credit default swap issues a basket option to repurchase the issuers' bonds.

79. The "Spread over US Treasuries" is often used to monitor the credit risk on countries in emerging markets. Another way to monitor the credit risk in emerging markets is to rely on ratings. Which of the following statements is incorrect?

a. The higher the "Spread over US Treasuries", the worse the credit risk of a country.
b. Changes in the "Spread over US Treasuries" usually anticipate the changes in the ratings of emerging markets.
c. There is no systematic relation between the "Spread over US Treasuries" and the rating of a country in emerging markets because rating agencies are too slow to react to changes in credit conditions for political reasons.
d. During the international crises observed in the last years (for instance, the Russian Crisis in 1998 and the Brazilian Devaluation Crisis in 1999) the "Spread over US Treasuries" of most emerging markets increased sharply.

80. Which of the following statements regarding linear regression is FALSE?

a. Heteroskedasticity occurs when the variance of residuals is not the same across all observations in the sample.
b. Unconditional heteroskedasticity leads to inefficient estimates, whereas conditional heteroskedasticity can lead to problems with both inference and estimation.
c. Serial correlation occurs when the residual terms are correlated with each other.
d. Multicollinearity occurs when a high correlation exists between or among two or more of the independent variables in a multiple regression.

END OF 2007 FRM PRACTICE EXAM II

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2007 FRM Practice Exam II

Answer Key

41.	a.	●	c.	d.		61.	●	b.	c.	d.
42.	●	b.	c.	d.		62.	a.	b.	●	d.
43.	●	b.	c.	d.		63.	a.	b.	●	d.
44.	a.	●	c.	d.		64.	a.	●	c.	d.
45.	a.	b.	●	d.		65.	a.	●	c.	d.
46.	a.	●	c.	d.		66.	a.	●	c.	d.
47.	a.	●	c.	d.		67.	a.	b.	c.	●
48.	a.	●	c.	d.		68.	a.	b.	c.	●
49.	●	b.	c.	d.		69.	a.	b.	c.	●
50.	a.	●	c.	d.		70.	a.	b.	●	d.
51.	a.	b.	●	d.		71.	a.	b.	●	d.
52.	a.	●	c.	d.		72.	a.	●	c.	d.
53.	a.	b.	●	d.		73.	●	b.	c.	d.
54.	a.	●	c.	d.		74.	a.	●	c.	d.
55.	a.	b.	c.	●		75.	a.	●	c.	d.
56.	a.	●	c.	d.		76.	a.	b.	●	d.
57.	a.	b.	c.	●		77.	a.	b.	●	d.
58.	a.	b.	c.	●		78.	●	b.	c.	d.
59.	a.	b.	c.	●		79.	a.	b.	●	d.
60.	a.	b.	●	d.		80.	a.	●	c.	d.

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2007 FRM Practice Exam II
Answers & Explanations

41. A company has been offered a USD 5 million term loan to be fully repaid only at maturity 2 years later. The bank estimates that it will recover only 55% of its exposure if the borrower defaults and that the likelihood of that happening is 0.1%. What is the bank's expected loss one year later?

a. USD 2,750
b. USD 2,250
c. USD 1,375
d. USD 1,125

CORRECT: B

After one year, the potential loss is:

*Loss = Prob(default) * exposure * (loss given default) = 0.001 * 5,000,000 * (1 - 0.55) = 2250*

Maturity is irrelevant here since the loan is to be repaid fully in 2 years.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 4.

INCORRECT: A
This solution incorrectly uses 55% as the loss given default.
INCORRECT: C
This solution incorrectly uses 55% as the loss given default and divides the potential loss by 2.
INCORRECT: D
This solution incorrectly divides the potential loss by 2.

42. Which of the following regarding corporate bond credit spreads is true?

I. The credit spread is approximately equal to a default probability times the fractional recovery rate plus a risk premium

II. Corporate bonds with lower credit ratings will have a larger credit spread

III. Credit spreads may not include liquidity premium components

IV. The non-taxable status of Treasury coupon payments helps to decrease the credit spread

a. II only
b. I and II only
c. I and III only
d. I and IV only

CORRECT: A

A lower credit rating implies a higher default probability and therefore a larger credit spread (II).

However, (I), (III) and (IV) are false. The credit spread is approximately equal to a default probability times (1 minus the fractional recovery rate) plus a risk premium, credit spreads may incorporate a component of liquidity premium because the corporate issue may not be as easily traded as the corresponding Treasury issue, and because Treasury bond coupon payments are non-taxable, investors are willing to accept a lower yield, which artificially increases the corporate yield spread.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: B
The credit spread is approximately equal to a default probability times (1 minus the fractional recovery rate) plus a risk premium.
INCORRECT: C
The credit spread is approximately equal to a default probability times (1 minus the fractional recovery rate) plus a risk premium, and credit spreads may incorporate a component of liquidity premium because the corporate issue may not be as easily traded as the corresponding Treasury issue.
INCORRECT: D
The credit spread is approximately equal to a default probability times (1 minus the fractional recovery rate) plus a risk premium, and because Treasury bond coupon payments are non-taxable, investors are willing to accept a lower yield, which artificially increases the corporate yield spread.

43. In Altman's credit-classification model, the higher the discriminant function value (Z-score):

a. The lower the default risk of the borrower.
b. The higher the default risk of the borrower.
c. The lower the recovery rate from debt instruments.
d. The Z-score indicates neither the default risk of the borrower nor the recovery rate of debt instruments.

CORRECT: A

All the ratios used in Altman's Z-score are designed so that their higher values indicate lower default risk, e.g. the ratio of sales/total assets indicates that the higher sales achieved from assets, the better the financial standing.

Reference: Anthony Saunders, Financial Institutions Management, 5th ed. Chapter 11.

INCORRECT: B
All the ratios used in Altman's Z-score are designed so that their higher values indicate lower default risk.
INCORRECT: C
In Altman's credit-classification model, the Z-score is an overall measure of the default risk classification of the borrower.
INCORRECT: D
In Altman's credit-classification model, the Z-score is an overall measure of the default risk classification of the borrower.

44. As the CRO of a firm specializing in mortgage-backed securities, you have been asked to explain how Interest-Only strips and Principal-Only strips would react if interest rates change. A portfolio manager is considering two types of mortgage derivative products for investment: Interest-Only strips (IO) and Principal-Only strips (PO). Which of the following is TRUE ?

a. When interest rates fall, both Principal-Only and Interest-Only strips will increase in value.
b. When interest rates fall, Principal-Only strips will increase in value, Interest-Only strips decrease in value.
c. When interest rates rise, Principal-Only strips will increase in value, Interest-Only strips decrease in value.
d. When interest rates rise, only both Principal-Only and Interest-Only strips will increase in value.

CORRECT: B

PO strips receive only principal payments and IO strips receive only interest payments on an underlying MBS (mortgage backed security). When interest rates fall, prepayments increase which increases the value of PO's and decreases the value of IO's.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 1.

INCORRECT: A
When interest rates fall, prepayments increase which decreases the value of IO's.
INCORRECT: C
When interest rates rise, prepayments decrease which decreases the value of PO's and increases the value of IO's.
INCORRECT: D
When interest rates rise, prepayments decrease which decreases the value of PO's.

45. Company ABC was incorporated on January 1, 2004. It has an expected annual default rate of 10%. Assuming a constant quarterly default rate, what is the probability that company ABC will not have defaulted by April 1, 2004?

a. 2.40%
b. 2.50%
c. 97.40%
d. 97.50%

CORRECT: C

For an annual default rate d_A and assuming a constant default rate, the quarterly default rate d_Q satisfies:

$$(1 - d_A) = (1 - d_Q)^4$$

Since d_A is 10%, d_Q = 2.6%, and so the probability of the company surviving to the second quarter is: 100% - 2.6% = 97.40%.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 3.

INCORRECT: A
This answer correctly calculates the quarterly default rate (d_Q) but the question asks for the probability the company survives, which is (1 - d_Q).
INCORRECT: B
This answer incorrectly calculates the quarterly default rate (d_Q) by simply dividing the annual default rate by 4, which ignores compounding. The question asks for the probability the company survives, which is (1 - d_Q).
INCORRECT: D
This answer correctly recognizes that the question asks for the probability the company survives the first quarter, which is (1 - d_Q) where d_Q is the quarterly default rate, but incorrectly calculates the quarterly default rate (d_Q) by simply dividing the annual default rate by 4, which ignores compounding.

46. You are given the following information about the returns of stock P and stock Q:

- Variance of return of stock P = 100.0
- Variance of return of stock Q = 225.0
- Covariance between the return of stock P and the return of stock Q = 53.2

At the end of 1999, you are holding USD 4 million in stock P. You are considering a strategy of shifting USD 1 million into stock Q and keeping USD 3 million in stock P. What percentage of risk, as measured by standard deviation of return, can be reduced by this strategy?

a. 0.50%
b. 5.00%
c. 7.40%
d. 9.70%

CORRECT: B

The portfolio with 100% Stock P has a variance of return equal to 100 and a standard deviation of return equal to 10.

Moving the portfolio to 75% Stock P and 25% Stock Q changes the variance to:

Variance = $(0.75)^2$ (100) + $(0.25)^2$ (225) + 2(0.75)(0.25)(53.2) = 56.25 + 14.06 + 19.95 = 90.26
Standard deviation = $(90.26)^{0.5}$ = 9.50

Hence, the percentage of risk reduced = (10 – 9.5)/10 = 5.0%.

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 3.

INCORRECT: A
This solution is the change in the standard deviation of return; the question asks for the percentage of risk reduced.
INCORRECT: C
*The standard deviation of return for a portfolio with y% in Stock P and (100 - y)% in Stock Q is: SQRT($(0.01*y)^2$ * 100 + $(0.01 * (100-y))^2$ * 225 + 2 * (0.01 * y) * (0.01 * (100 - y)) * 53.2).*
INCORRECT: D
The question asks for the percentage of risk reduced, where risk is measured by standard deviation of return, not the variance of return.

47. Which of the following statements about its methodology for calculating an operational risk capital charge in Basel II is correct?

a. Basic Indicator Approach is suitable for institutions with sophisticated operational risk profile.
b. Under the Standardized Approach, capital requirement is measured for each of the business line.
c. Advanced Measurement Approaches (AMA) will not allow an institution to adopt its own method of assessment of operational risk.
d. AMA is less risk sensitive than the Standardized Approach.

CORRECT: B

Under the Standardized Approach, the capital requirement is measured for each business line.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

INCORRECT: A
The Basic Indicator Approach is only suitable for institutions with a relatively simple operational risk exposure.
INCORRECT: C
AMA allows an institution to use its own methodology of operational risk measurement subject to regulatory approval.
INCORRECT: D
AMA is more risk sensitive to the Basic Indicator Approach or Standardized Approach.

48. Which of the following credit risk models in Basel II attempts to recognize diversification effects through a granularity adjustment?

a. Standardized approach based on external credit ratings provided by external credit assessment institutions
b. Internal Rating Based approach using internal estimate of creditworthiness, subject to regulatory standards
c. Standardized approach based on internal portfolio credit risk model
d. All of the above

CORRECT: B

The Standardized approach does not recognize diversification effects. Capital requirements under Internal Rating Based (IRB) approach are modified to reflect the overall diversification or "granularity" in a bank's loan portfolio. The granularity adjustments construct a specific regulatory measure of diversification of a bank's portfolio. This measure is then used to increase or decrease the baseline IRD regulatory capital requirements. If the regulatory diversification measure indicates that a portfolio is well (poorly) diversified, the granularity adjustment decreases (increases) regulatory capital from the IRB baseline. Under IRB banks estimate default probabilities of counterparties using their own methods subject to regulatory standards, which are then used with modified standardized inputs that come from the standardized approach.

Reference: Arnaud De Servigny and Olivier Renault, Measuring and Managing Credit Risk, Chapter 10.

49. A relative value hedge fund manager holds a long position in Asset A and a short position in Asset B of roughly equal principal amounts. Asset A currently has a correlation with Asset B of .97. The risk manager decides to overwrite this correlation assumption in the variance-covariance based VAR model to a level of 0.30. What effect will this change in correlation from 0.97 to 0.30 have on the resulting VAR measure?

a. It increases VAR.
b. It decreases VAR.
c. It has no effect on VAR, but changes profit or loss of strategy.
d. Do not have enough information to answer.

CORRECT: A

With a correlation of 0.97, any increase (decrease) in value in the short position in Asset B will be almost completely offset by a decrease (increase) in the value of the long position in Asset A, which implies a very low VaR. Reducing the correlation to 0.30 reduces the effectiveness of this hedge, which implies a higher VaR.

Reference: Philippe Jorion, Value at Risk, 3rd ed. Chapter 17.

INCORRECT: B
With a correlation of 0.97, any increase (decrease) in value in the short position in Asset B will be almost completely offset by a decrease (increase) in the value of the long position in Asset A, which implies a very low VaR.
INCORRECT: C
Changing the correlation between Asset A and Asset B will change VaR.volatility.
INCORRECT: D
Reducing the correlation between Asset A and Asset B will change VaR and the direction of that change can be determined from the information provided.

50. Consider an A rated bond and a BBB rated bond. Assume that the one-year probabilities of default for the A and BBB rated bonds are 2% and 4%, respectively, and that the joint probability of default of the two bonds is 0.15%. What is the default correlation between the two bonds?

a. 0.07%
b. 2.60%
c. 93.00%
d. The default correlation cannot be calculated with the information provided.

CORRECT: B

*Let b_A be the event that the A rated bond defaults. Then b_A is a Bernoulli variable, with mean p(A) = 0.02 and standard deviation σ_A = SQRT(p(A) * (1 - p(A)) = SQRT(0.02 * 0.98) = 0.14. Similarly, let b_B be the event that the BBB rated bond defaults. Then b_B is a Bernoulli variable, with mean p(B) = 0.04 and standard deviation σ_B = SQRT(p(B) * (1 - p(B)) = SQRT(0.04 * 0.96) = 0.196.*

Then default correlation, ρ, is calculated as follows:

$$\rho = (p(A \text{ and } B) - p(A) * p(B)) / (\sigma_A * \sigma_B)) = (0.15 - 0.02 * 0.04) / (0.14 * 0.196) = 2.6\%$$

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 3.

INCORRECT: A
*This solution incorrectly calculates the correlation as Prob(Both default) - Prob(A defaults) * Prob(BBB defaults) = 0.0015 - 0.02 * 0.04 = 0.07%.*
INCORRECT: C
This solution results from incorrectly calculating the standard deviations by forgetting to take the square root.
INCORRECT: D
To calculate the default correlation, we need the joint probability of default and the individual probabilities of default, which we have.

51. *Estimation or parameter risk is an example of:*

a. Changing position risk
b. Dual inadequacy risk
c. Model risk
d. Stability risk

CORRECT: C

Estimation or parameter risk arises from setting model parameter values and is an example of model risk.

Reference: Kevin Dowd, Measuring Market Risk, 2nd ed. Chapter 16.

52. • The two-year risk-free rate in the United Kingdom is 8% per annum, continuously compounded
• The two-year risk-free rate in France is 5% per annum, continuously compounded
• The current French Franc to the GBP currency exchange rate is that one unit of GBP currency costs 0.75 units of French Franc's

What is the two-year forward price of one unit of the GBP in terms of the French Franc so that no arbitrage opportunity exists?

a. 0.578
b. 0.706
c. 0.796
d. 0.973

CORRECT: B

Let S_0 be the current spot price in GBP of one Franc and let F_0 be the forward price of one GBP in Franc. Then,

$F_0 = S_0 * \exp((r_F - r_{GB}) * T) = 0.75 * \exp((0.05 - 0.08) * 2) = 0.706$

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 4.

INCORRECT: A
This answer incorrectly adds the UK and French risk-free rates.
INCORRECT: C
This answer incorrectly sets the UK risk-free rate to 5% and the French risk-free rate to 8%.
INCORRECT: D
This answer incorrectly adds the UK and French risk-free rates.

53. You have been asked to help communicate to business unit managers some practical considerations in developing key risk indicators (KRIs) and collecting data. Which of the following should not be on your list of talking points?

a. KRI definitions will consider the rationale for the risk indicator, description of the measurement criteria, and the sources of data.
b. KRIs must be continually validated and refined.
c. Select KRIs based on their data availability first and predictive value second.
d. Each KRI should be weighted in accordance with its significance, or predictive capabilities

CORRECT: C

You would always select KRIs based on their predictive value first and data availability second.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

54. Which of the following statements about the linear regression of the return of a portfolio over the return of its benchmark presented below are correct?

Portfolio parameter	Value
Beta	1.25
Alpha	0.26
Coefficient of determination	0.66
Standard deviation of error	2.42

I. The correlation is 0.71
II. 34% of the variation in the portfolio return is explained by variation in the benchmark return
III. The portfolio is the dependent variable
IV. For an estimated portfolio return of 12%, the confidence interval at 95% is [7.16%;16.84%]

a. II and IV
b. III and IV
c. I, II and III
d. II, III and IV

CORRECT: B

*The portfolio return is the dependent variable and for an estimated portfolio return of 12%, the 95% confidence interval is [12% - 2 * 2.42%, 12% + 2 * 2.42%] or [7.16%, 16.84%].*

However, the correlation is the square root of the coefficient of determination and is therefore equal to 0.81, and 66% of the variation in the portfolio returns is explained by variation in the benchmark return.

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 8.

55. Which of the following statements are true?

I. To ensure higher effectiveness in managing operational risk, the operational risk manager's compensation should be linked to trader performance
II. Stop-loss limits are less effective as an operational risk measure than exposure limits because exposure limits consider future market risk movements while stop-loss limits are backward looking
III. As annual audits of listed entities are regulatory and mandatory by nature, they should not be seen as a material part of operational risk management
IV. The long option like feature of most traders' compensation packages substantially increases operational risk

a. I, III and IV
b. II and IV
c. II only
d. IV only

CORRECT: D

Operational risk is increased if traders are highly compensated when they make big profits but do not lose the same type of money when they incur losses (IV). They therefore take higher risks to obtain higher returns.

Statements (I), (II) and (III) are invalid. To avoid potential conflicts of interest, the operational risk manager's compensation should be independent of traders' performance, exposure limits do not consider future market movements, and annual audits are an integral part of operational risk management.

Reference: Reto Gallati, Risk Management and Capital Adequacy. Chapter 6.

INCORRECT: A
Operational risk is increased if traders are highly compensated when they make big profits but do not lose the same type of money when they incur losses (IV). However, to avoid potential conflicts of interest, the operational risk manager's compensation should be independent of traders' performance (I), and annual audits are an integral part of operational risk management (III).
INCORRECT: B
Operational risk is increased if traders are highly compensated when they make big profits but do not lose the same type of money when they incur losses (IV). However, exposure limits do not consider future market movements (II).
INCORRECT: C
Exposure limits do not consider future market movements (II).

56. A 90-day European put option on Microsoft has an exercise price of $30. The current market price for Microsoft is $30. The delta for this call option is close to:

a. -1.0
b. -0.5
c. 0.5
d. 1.0

CORRECT: B

The delta of an at-the-money put option is close to -0.5. The delta of a put option approaches minus one as the put goes deep in the money, and approaches zero as the put goes deep out of the money.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 15.

INCORRECT: A
The delta of a put option approaches minus one as the put goes deep in the money, and approaches zero as the put goes deep out of the money.
INCORRECT: C
The delta of a put option approaches minus one as the put goes deep in the money, and approaches zero as the put goes deep out of the money.
INCORRECT: D
The delta of a put option approaches minus one as the put goes deep in the money, and approaches zero as the put goes deep out of the money.

57. Credit derivatives are instruments used to trade credit risk. When an institution has sold exposure to another institution (i.e., purchased protection) in a credit default swap, it has exchanged the risk of default on the underlying asset for which of the following?

a. Default risk of the counterparty
b. Default risk of a credit exposure identified by the counterparty
c. Joint risk of default by the counterparty and of the credit exposure identified by the counterparty
d. Joint risk of default by the counterparty and the underlying asset

CORRECT: D

When an institution purchases protection from counterparty in a credit default swap, the purchaser of the credit protection will experience a credit loss only if the underlying asset and the counterparty in the credit derivative transaction both default. If only one defaults, there is no credit risk.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: A
The counterparty defaulting is only a problem if the underlying asset defaults also.
INCORRECT: B
The risk of credit exposure identified by the counterparty is incorrect.
INCORRECT: C
The risk of credit exposure identified by the counterparty is incorrect.

58. The S&P March 2005 index futures contract is trading at 280. The associated American 260 call option is at 16 and the associated 260 American put option is at 3. Which of the following strategies would you select to lock in a profit?

a. No strategy would result in a risk-free profit.
b. Buy the put, sell the call and buy the futures contract.
c. Buy and exercise the put and buy the futures contract.
d. Buy and exercise the call and sell the futures contract.

CORRECT: D

If you buy and exercise the call, the total cost is $16 + $260 = $276. Then selling the futures contract would generate $280, so the total locked-in profit would be $4.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 8.

INCORRECT: A
There is a strategy that results in risk-free profit.
INCORRECT: B
If you buy the put (cost $3), sell the call (revenue $16) and buy the futures contract (cost $280), you lock in revenue of $260 in March, so the net result is a loss of $7.
INCORRECT: C
This strategy is impossible since the put is out-of-the-money and therefore cannot be exercised

59. Which one of the following statements is incorrect regarding the margining of exchange-traded futures contracts?

a. Day trades and spread transactions require lower margin levels.
b. If an investor fails to deposit variation margin in a timely manner the positions may be liquidated by the carrying broker.
c. Initial margin is the amount of money that must be deposited when a futures contract is opened.
d. A margin call will be issued only if the investor's margin account balance becomes negative.

CORRECT: D

A margin call is issued whenever the balance of margin account is less than maintenance margin. A margin call is not dependent on the margin account becoming negative.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 3.

INCORRECT: A
This statement is true - day trades and spread transactions generally require lower margin levels.
INCORRECT: B
This statement is true - the carrying broker may liquidate positions if an investor fails to deposit the variation margin the day after a margin call is received.
INCORRECT: C
This statement is true - the initial margin is the amount of money that must be deposited upon opening a futures contract.

60. Which of the following is not a type of operational risk as defined by Basel II?

a. Human error and internal fraud
b. Destruction by fire or other external catastrophes
c. Damaged reputation due to a failed merger
d. Failure or breakdown in internal control processes

CORRECT: C

The BIS defines operational risk (inclusive of technological risk) as 'the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events'. Although a number of financial institutions add reputation risk and strategic risk (e.g. due to a failed merger) as part of a broadened definition of operational risk, they are not within the scope of definition by the BIS.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

INCORRECT: A
The BIS definition of operational risk includes people risk.
INCORRECT: B
The BIS definition of operational risk includes external event risk.
INCORRECT: D
The BIS definition of operational risk includes failed internal processes risk.

61. Consider the following linear regression model: Y = a + b*X + e. Suppose a = 0.05, b = 1.2, Std(Y) = 0.26, Std(e) = 0.1, what is the correlation between X and Y?

a. 0.923
b. 0.852
c. 0.701
d. 0.462

CORRECT: A

The standard deviation of X can be calculated as follows:

$$std(X) = SQRT((std(Y)^2 - std(e)^2) / b^2) = SQRT((0.26^2 - 0.1^2) / 1.2^2) = 0.2$$

Then, the correlation between X and Y can be calculated as follows:

$$Corr(X,Y) = b * std(X) / std(Y) = 1.2 * 0.2 / 0.26 = 0.923$$

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 8.

INCORRECT: B
This answer incorrectly squares the correlation between X and Y.
INCORRECT: C
*The correct answer can be found by noting that Cov(Y,X) = b * V(x) and by definition, Cov(Y,X) = Corr(X,Y) * std(X) * std(Y).*
INCORRECT: D
*The correct answer can be found by noting that Cov(Y,X) = b * V(x) and by definition, Cov(Y,X) = Corr(X,Y) * std(X) * std(Y).*

62. For a zero-coupon bond the probability of defaulting over the next year is 0.4% and the average (annualized) probability of defaulting over the next two years is 0.6%. What is the marginal probability of default during the second year assuming risk-neutral pricing?

a. 0.18%
b. 0.33%
c. 0.80%
d. 0.90%

CORRECT: C

Let D_2 denote the annualized probability of default over the next two years and let d_n denote the marginal probability of default during the nth year. Then,

$$(1 - D_2)^2 = (1 - d_1) * (1 - d_2)$$
$$(1 - 0.006)^2 = (1 - 0.004) * (1 - d_2)$$

So, $d_2 = 0.80\%$.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 3.

63. Suppose JP Morgan Chase enters into a 5-year, USD 5 million, interest rate swap with Citibank. JP Morgan Chase will receive annual payments at a fixed rate of 8% and will make payments to Citibank based on 1-year LIBOR. Calculate the potential exposure to JP Morgan Chase in 1 year if the swap rate after 1 year is 11%.

a. USD +150,000
b. USD -150,000
c. 0
d. USD -550

CORRECT: C

Interest differential for JP Morgan Chase is 8% - 11% = -3%. If Citibank defaults, JP Morgan Chase will earn an additional profit for replacing the receive-fixed swap at a higher rate. So, JP Morgan Chase is not exposed to a default by Citibank, and hence JP Morgan Chase's potential exposure in 1 year is $0.

Reference: Gunter Meissner, Credit Derivatives. Chapter 4.

INCORRECT: A
If Citibank defaults, JP Morgan Chase would benefit and is therefore not exposed to a default by Citibank.
INCORRECT: B
If Citibank defaults, JP Morgan Chase would benefit. This answer incorrectly sets the rate JP Morgan Chase pays to 11% and the amount it receives to 8%.
INCORRECT: D
If Citibank defaults, JP Morgan Chase would benefit.

64. Assume that a risk manager wants to calculate VAR for an S&P 500 futures contract using the historical simulation approach. The current price of the contract is 935 and the multiplier is 250. Given the historical price data shown below for the previous 300 days, what is the VAR of the position at 99% using the historical simulation methodology?

Returns: -6.1%, -6%, -5.9%, -5.7%, -5.5%, -5.1% …… 4.9%, 5%, 5.3%, 5.6%, 5.9%, 6%

a. USD 13,324
b. USD 13,791
c. USD 14,025
d. USD 14,259

CORRECT: B

The 99% return among 300 observations would be the third worst observation among the returns. Among the returns given above, the third worst return is –5.9%. The 99% VAR for this position is therefore (935)(250)(0.059) = $13,791.

Reference: Philippe Jorion, Value at Risk, 3rd ed. Chapter 10.

INCORRECT: A
This answer incorrectly uses the fourth worst observation as the 99% return among 300 observations.
INCORRECT: C
This answer incorrectly uses the second worst observation as the 99% return among 300 observations.
INCORRECT: D
This answer incorrectly uses the worst observation as the 99% return among 300 observations.

65. Which of the following illustrates losses caused by Firm A's operational risk exposure?

I. After a surprise announcement by the central bank that interest rates would increase, bond prices fall and Firm A incurs a significant loss on its bond portfolio
II. The data capture system of Firm A fails to capture the correct market rates causing derivative trades to be done at incorrect prices, leading to significant losses
III. As a result of a workers strike the share price of a company that Firm A invested in falls significantly, causing major investment losses
IV. A counterparty of Firm A fails to settle their debt to Firm A and in doing this they are in breach of a legal agreement to pay for services rendered resulting in a material exposure

a. I, II and IV only
b. II only
c. II and III only
d. II, III and IV only

CORRECT: B

In (II), systems failure or incorrect systems caused the problem. The losses are directly due to an operational risk exposure. (I) and (III), an increase in interest rates and the fall in the value of an investment, are both examples of market risk exposure. (IV), failure to repay debt, is an example of credit risk exposure.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

66. What are the key issues involved in the use of loss data for modeling operational risk?

I. External loss data can be easily incorporated into operational risk modeling to complement internal loss data
II. Most firms face significant problems in gathering sufficient relevant loss data
III. To obtain sufficient loss data, scenario analysis can be used to create data synthetically.
IV. Unlike external loss data, internal loss data collected over a long period of time do not need relevancy adjustments

a. I and III only
b. II and III only
c. I, II and III only
d. II, III and IV only

CORRECT: B

Obtaining sufficient relevant loss data is generally difficult and scenario analysis can be used to create data synthetically.

However, there are many problems associated with the use of external loss data, especially on the need to solve the problem of relevancy due to difference in operating and control environments, and the older the internal loss data, the less relevant are the loss data to the firm's current risk and control environment, due to the dynamic nature of a business.

Reference: Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach. Chapter 5.

INCORRECT: A
There are many problems associated with the use of external loss data, especially on the need to solve the problem of relevancy due to difference in operating and control environments.
INCORRECT: C
There are many problems associated with the use of external loss data, especially on the need to solve the problem of relevancy due to difference in operating and control environments.
INCORRECT: D
The older the internal loss data, the less relevant are the loss data to the firm's current risk and control environment, due to the dynamic nature of a business.

67. A risk manager believes that there is some probability that ABC Company's bond rating will be revised downward from A to A-. She wants to obtain an estimate of the change in value of the company's bond if such a change takes place. Which of the following approaches should she not use to estimate the impact of the rating change on the price of the company's bond?

a. Multiply the change in yield spread resulting from the rating change by the modified duration of the bond using the average yield to maturity or the option adjusted spread, by bond rating class.
b. Estimate the new forward curve after the rating change, compute the price of the bond using the new curve for the remaining cash flows, and compare that to the original bond price.
c. Empirically estimate historical price changes following a rating change on a large sample of bonds across different rating classes using an "event study" methodology.
d. Calculate the price change of the bond the last time a rating change occurred and use it as your estimate.

CORRECT: D

This approach is not reasonable for several reasons, including the total lack of information given about how to set a volatility input or distribution type. More importantly, the price change of the bond for the last rating change might well correspond to a different kind of migration (eg, AAA to A) than the one being contemplated now, and possibly, there has never a prior ratings change in this series.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 2.

68. A portfolio manager holds a call option on a stock that does not pay dividends. Leaving for vacation, he wants to give instructions to his trader on when to exercise an option he purchased on that stock. When should the trader exercise the option?

a. After a better-than-expected quarterly report
b. Only when the exercise price is greater than the strike price
c. Only when the strike price is greater than the exercise price
d. Never

CORRECT: D

Calls on a non-dividend paying stock should never been exercised before the expiration date due to the time value of money and the insurance provided by the option.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 9.

INCORRECT: A, B & C
Calls on a non-dividend paying stock should never been exercised before the expiration date.

69. A sound risk management process would include which of the following primary components:

I. A comprehensive risk measurement approach
II. A detailed structure of limits
III. Guidelines and other parameters used to govern risk taking
IV. Strong risk management unit with a dual reporting relationship to the firm's head trader and chief risk officer

a. I, II and IV only
b. II, III and IV only
c. IV only
d. I, II and III only

CORRECT: D

A comprehensive risk measurement approach, a detail structure of limits and guidelines used to govern risk taking are all part of a sound risk management function.

Further, due to potential conflicts of interest, the risk management unit should not report to the firm's head trader.

Reference: René Stulz, Risk Management & Derivatives. Chapter 2-3.

70. The failure of Barings Bank is a typical example of a lack in control pertaining to which one of the following risks:

a. Liquidity Risk
b. Credit Risk
c. Operational Risk
d. Foreign exchange Risk

CORRECT: C
The inability to manage and monitor traders' activities was the primary cause of the Barings Bank failure.

Reference: Reto Gallati, Risk Management and Capital Adequacy, Chapter 6.

71. Which of the following statements about the delta-normal VaR methodology is NOT true?

a. It may underestimate the occurrence of large observations due to its reliance on a normal distribution.
b. It cannot account for non-linear effects such as those resulting from embedded options.
c. It is similar to historical simulation except that the movements in risk factors are generated by drawing from some distribution.
d. It is appropriate for allocating economic capital for a fixed-income desk unless it contains many bonds with embedded options.

CORRECT: C

Historical simulation is more appropriate for a wide range of valuations, including extreme events.

Reference: Philippe Jorion, Value At Risk, 3rd ed. Chapter 10.

INCORRECT: A
The delta-normal VAR methodology does assume a normal distribution and therefore may underestimate extreme events.
INCORRECT: B
The delta-normal VAR methodology cannot account for non-linear effects.
INCORRECT: D
The delta-normal VAR methodology cannot account for non-linear effects.

72. A non-dividend-paying stock has a current price of $100 per share. You have just sold a six-month European call option contract on 100 shares of this stock at a strike price of $101 per share. You want to implement a dynamic delta hedging scheme to hedge the risk of having sold the option. The option has a delta of 0.50. You believe that delta would fall to 0.44 if the stock price falls to $99 per share.

- Identify what action you should take NOW (i.e., when you have just written the option contract) to make your position delta neutral
- After the option is written, if the stock price falls to $99 per share, identify what action should be taken at that time, i.e. LATER, to rebalance your delta-hedged position

a. NOW: buy 50 shares of stock, LATER: buy 6 shares of stock
b. NOW: buy 50 shares of stock, LATER: sell 6 shares of stock
c. NOW: sell 50 shares of stock, LATER: buy 6 shares of stock
d. NOW: sell 50 shares of stock, LATER: sell 6 shares of stock

CORRECT: B

NOW: You have sold a call on 100 shares, that means you are short delta of 0.50 x 100, which is delta = -50. To be delta neutral, you must long (i.e. buy) 50 shares of stock.

LATER: As price falls to $99, the delta moves to -44 = -0.44 x 100. To be delta neutral, your portfolio needs to have 44 shares of stock. You purchased 50 shares at time 0. To rebalance, you must sell 6 shares.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 15.

INCORRECT: A
As price falls from $100 to $99, delta falls from 0.50 to 0.44. Since you sold the call, the delta hedge would buy shares initially then sell shares as the delta falls.
INCORRECT: C
Since you sold the call and delta is 0.50, the delta hedge would buy shares initially then sell shares as the delta falls.
INCORRECT: D
Since you sold the call and delta is 0.50, the delta hedge would buy shares initially then sell shares as the delta falls.

73. An investor enters into a short position in a gold futures contract at USD 294.20. Each futures contract controls 100 troy ounces. The initial margin is USD 3,200, and the maintenance margin is USD 2,900. At the end of the first day, the futures price drops to USD 286.6. Which of the following is the amount is the variation margin at the end of the first day?

a. 0
b. USD 34
c. USD 334
d. USD 760

CORRECT: A

*Since the investor is shorting the futures contract, she/he gains when the futures price goes down. At the end of the first day, the investor has a gain of (294.2 – 286.6) * 100 = $ 760. Therefore, no variation margin is needed.*

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 3.

INCORRECT: B, C & D
An investor would only receive a margin call when the value of the investment decreases.

74. Hong Kong Shanghi Bank has entered into a repurchase agreement with a client where the client will sell a 10-year US treasury bond to the bank and repurchase it in 10 days. The bond has a notional value of USD 10m, trades at par with the yield volatility for a 10-year US treasury 0.074%. The swap's maximum potential exposure at a 99% confidence level is closest to:

a. USD 320,000
b. USD 380,000
c. USD 550,000
d. USD 1,200,000

CORRECT: B

The approximate duration for a 10 year bond is 7.0. The volatility of the swap value over 10 years is calculated as follows:

$$\sigma(V) = [\text{market\_value} * \text{duration} * \text{yield volatility} * (10)^{0.5}]$$
$$= 10{,}000{,}000 * 7.0 * 0.00074 * 3.16 = 163{,}806.$$

To get the 99% confidence interval, we multiply $\sigma(V)$ by 2.33, which gives approximately $380,000.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 7.

INCORRECT: A
To get the 99% confidence interval, this answer incorrectly multiplies the volatility of the swap value by 2.0; the volatility of the swap value should be multiplied by 2.33.
INCORRECT: C
This answer incorrectly sets the duration to 10.
INCORRECT: D
This answer results from forgetting to take the square root of the horizon length.

75. Suppose X follows an AR(1) model: X(t) = 0.1 + 0.8*X(t-1) + e(t), where, E(e(t)) = 0. What is the long term mean of X?

a. 0.1250
b. 0.5000
c. 2.0000
d. 0.0000

CORRECT: B

For a AR(1) model of the form: X(t) = alpha + beta X(t-1) + e(t), where E[e(t)] = 0, the long term mean of X is alpha / (1-beta).
For this problem, the long term mean of X is 0.5000 = 0.1 / (1.0 - 0.8).

Reference: Philippe Jorion, Value At Risk, 3rd ed. Chapter 9.

INCORRECT: A
This solution incorrectly calculates the long term mean of X to be 0.1/0.8 = 0.125
INCORRECT: C
This solution incorrectly calculates the long term mean of X to be (1.0 - 0.8) / 0.1 = 2.000
INCORRECT: D

76. A currency options trader enters into the following transactions:

- Buys a European-styled EUR call/YEN put option with a strike price of 132.05 maturing in 2 months
- Sells a European-styled EUR call/YEN put option with a strike price of 132.75 maturing in 1 month

By doing so, the trader effectively created a:

a. Bear spread on EUR/YEN
b. Bull spread on EUR/YEN
c. Diagonal spread on EUR/YEN
d. Reverse calendar spread on EUR/YEN

CORRECT: C
In a diagonal spread, both the expiration dates and strike prices of the options are different.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 10.

INCORRECT: A
A bear spread is created by buying a call with a high strike price and selling a call with a lower strike on the same underlying asset with the same maturity date. In this instance, the purchased call has a lower strike price than the sold option, and the maturity dates are different.
INCORRECT: B
A bull spread is created by buying a call option with a certain strike price and selling a call option with a higher strike on the same underlying asset with the same maturity date. Although in this instance the strike prices are different, the maturity dates differ.
INCORRECT: D
The options used to create a calendar spread have the same strike price but different maturities. A reverse calendar spread is created by buying a short maturity call option and selling a longer maturity call option with the same strike price. Although the maturities in this instance are different, the strike prices are also different.

77. All of the following are different ways to structure credit enhancement in support of a securitization except:

a. Cash reserve account
b. Subordinated tranches of securitized debt
c. Collateralization
d. Excess spread

CORRECT: C

Collaterization is not a way to structure credit enhancement.

Reference: Gunter Meissner, Credit Derivatives. Chapter 5.

INCORRECT: A
The originator may establish a cash reserve account to absorb credit losses.
INCORRECT: B
Subordinated tranches absorb losses on the underlying assets before more senior tranches.
INCORRECT: D
Excess spread is typically the first to absorb credit losses.

78. A first-to-default basket credit default swap is a credit derivative that:

a. Entails a number of reference entities and provides a payoff only when the first reference entity defaults.
b. Entails a number of reference entities and provides a payoff only when the first entity's recovery rate is higher than the rest of the entities in the swap.
c. Provides a payoff when the first entity of the credit default swap issues securities.
d. Provides a payoff when the first entity of the credit default swap issues a basket option to repurchase the issuers' bonds.

CORRECT: A

In a basket credit default swap, there a number of reference entities and the swap only provides a payoff when the first reference entity defaults.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

79. The "Spread over US Treasuries" is often used to monitor the credit risk on countries in emerging markets. Another way to monitor the credit risk in emerging markets is to rely on ratings. Which of the following statements is incorrect?

a. The higher the "Spread over US Treasuries", the worse the credit risk of a country.
b. Changes in the "Spread over US Treasuries" usually anticipate the changes in the ratings of emerging markets.
c. There is no systematic relation between the "Spread over US Treasuries" and the rating of a country in emerging markets because rating agencies are too slow to react to changes in credit conditions for political reasons.
d. During the international crises observed in the last years (for instance, the Russian Crisis in 1998 and the Brazilian Devaluation Crisis in 1999) the "Spread over US Treasuries" of most emerging markets increased sharply.

CORRECT: C
There is a systematic relation between the "Spread over US Treasuries" and the rating of a country in emerging markets.

Reference: Anthony Saunders, Financial Institutions Management, 5th ed. Chapter 16.

INCORRECT: A
Generally, the higher the spread over US Treasuries, the higher the credit risk of a country.
INCORRECT: B
Changes in the "Spread over US Treasuries" usually anticipate the changes in the ratings of emerging markets.
INCORRECT: D
The "Spread over US Treasuries" of most emerging markets increased sharply during the international crises observed in recent years.

80. Which of the following statements regarding linear regression is FALSE?

a. Heteroskedasticity occurs when the variance of residuals is not the same across all observations in the sample.
b. Unconditional heteroskedasticity leads to inefficient estimates, whereas conditional heteroskedasticity can lead to problems with both inference and estimation.
c. Serial correlation occurs when the residual terms are correlated with each other.
d. Multicollinearity occurs when a high correlation exists between or among two or more of the independent variables in a multiple regression.

CORRECT: B
Conditional heteroskedasticity is heteroskedasticity that is correlated with the values of the independent variables. Conditional heteroskedasticity exists if the variance of the residual term increases as the value of the independent variable increases. It creates significant problems for statistical interference. Unconditional heteroskedasticity occurs when the heteroskedasticity is not correlated with the independent variables, which means that it does not systematically increase or decrease with changes in the value of the independent variable(s). While this is a violation of the equal variance assumption, it usually causes no major problems with the regression.

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 8.

INCORRECT: A
This statement is true - Heteroskedasticity occurs when the residuals have different variances across observations.
INCORRECT: C
This statement is true - serial correlation means the residual terms are correlated.
INCORRECT: D
This statement is true - multicollinearity arises when the independent variables are highly correlated.

End of 2007 FRM Practice Exam II
Answers & Explanations

2007 FRM Practice Exam III
Candidate Answer Sheet

81.	a.	b.	c.	d.	101.	a.	b.	c.	d.
82.	a.	b.	c.	d.	102.	a.	b.	c.	d.
83.	a.	b.	c.	d.	103.	a.	b.	c.	d.
84.	a.	b.	c.	d.	104.	a.	b.	c.	d.
85.	a.	b.	c.	d.	105.	a.	b.	c.	d.
86.	a.	b.	c.	d.	106.	a.	b.	c.	d.
87.	a.	b.	c.	d.	107.	a.	b.	c.	d.
88.	a.	b.	c.	d.	108.	a.	b.	c.	d.
89.	a.	b.	c.	d.	109.	a.	b.	c.	d.
90.	a.	b.	c.	d.	110.	a.	b.	c.	d.
91.	a.	b.	c.	d.	111.	a.	b.	c.	d.
92.	a.	b.	c.	d.	112.	a.	b.	c.	d.
93.	a.	b.	c.	d.	113.	a.	b.	c.	d.
94.	a.	b.	c.	d.	114.	a.	b.	c.	d.
95.	a.	b.	c.	d.	115.	a.	b.	c.	d.
96.	a.	b.	c.	d.	116.	a.	b.	c.	d.
97.	a.	b.	c.	d.	117.	a.	b.	c.	d.
98.	a.	b.	c.	d.	118.	a.	b.	c.	d.
99.	a.	b.	c.	d.	119.	a.	b.	c.	d.
100.	a.	b.	c.	d.	120.	a.	b.	c.	d.

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2007 FRM Practice Exam III
Questions

81. An option on a stock has a payoff equal to the square of the positive excess of the stock price over the exercise price at expiration only if the stock exhibits an annual growth rate of 15% or more every year. Given the following assumptions and using a three-step binomial model and rounding to the nearest USD, which of the following would be the option's price?

- Time to expiration is three years.
- Current price is USD10.
- The annual standard deviation is 15%.
- The risk-free interest rate is 5% per year.
- The strike price is USD10.
- Assume the stock pays no dividends.

a. USD 7
b. USD 8
c. USD 9
d. USD 10

82. For a market variable S, the GARCH (1,1) model is defined as:

$$\sigma_n^2 = \gamma * V_L + \alpha * u_{n-1}^2 + \beta * \sigma_{n-1}^2$$

where

σ_n = estimate made at end of day n - 1 for day n
V_L = long-run average variance rate
γ = weight assigned to V_L
u_{n-1} = percentage change in S between end of day (n–2) and end of day (n–1)
α = weight assigned to u_{n-1}^2
σ_{n-1} = estimate made at end of day (n–2) for day (n–1)
β = weight assigned to σ_{n-1}^2

What is the annualized volatility for a five days option starting from day n by GARCH(1,1) based on the following listed parameters?

$V_L = 0.000055$
$\alpha = 0.013$
$\beta = 0.75$
$\sigma_n^2 = 0.00006$

a. 0.09%
b. 2.91%
c. 12.10%
d. 192%

83. Company X owns a property with a book value of €80,000. There is a buyer willing to pay €200,000 for the property. However, Company X must also provide the buyer with a put option to sell the property back to Company X for €200,000 at the end of 2 years. Moreover, Company X agrees to pay the buyer €40,000 for a call option to repurchase the property for €200,000 at the end of 2 years. In effect, with this transaction Company X "borrows" money from the buyer. What is the annually compounded interest rate per year on this implied loan?

a. 11.80%
b. 25.00%
c. 41.40%
d. Cannot be determined.

84. If a European call option is written on a dividend paying stock, an increase in which of the following will not automatically result in an increased option price?

a. The stock price.
b. The risk-free rate.
c. The time to expiration.
d. The volatility of the stock price.

85. Company B makes a bid for Company A at € 15 per share. Although the bid may or may not ultimately be successful, the price of Company A jumps because of the bid. A merger arbitrage manager acquires a long position in Company A and a short position in Company B. When constructing the variance-covariance matrix used for the VaR calculation, which of the following is the best choice among the following alternatives when computing the volatility of the companies and their correlations?

a. EWMA volatility, EWMA correlation
b. EWMA volatility, Equal weight correlation
c. Equal weight volatility, EWMA correlation
d. Equal weight volatility, Equal weight correlation

86. Which of the following causes led Metallgesellschaft Refining and Marketing Inc (MGRM) into severe financial distress?

I. There was a mismatch of cash flows from hedge and physical transactions
II. MGRM failed to consider hedging market risk from fixed price physical sales contracts
III. MGRM held a great percentage of the total open interest on the NYMEX
IV. The futures market went from backwardation to contango

a. I and III
b. I and IV
c. I, III and IV
d. II, III and IV

87. Under the Internal Ratings Based approach of Basel II, inputs are set by the Basel Committee or the bank which has adopted that approach. Which of the following inputs is always set by the bank?

a. Asset correlation
b. Confidence level
c. Probabilities of default
d. Loss given default

88. Consider a two-asset portfolio. The portfolio weight of Asset A is 0.6 and the portfolio weight of Asset B is 0.4. The value of the total portfolio is USD1 million and its standard deviation of its decimal return is 0.060606. If the betas of Asset A and Asset B are 0.8 and 1.3 respectively, the respective marginal VAR of Asset A and the component VAR of Asset B at a 95% confidence level are closest to:

a. USD 0.80 and USD 52,000
b. USD 0.80 and USD 48,000
c. USD 0.08 and USD 52,000
d. USD 0.08 and USD 48,000

89. According to the Basel Committee which of the options below is **NOT** a qualitative standard that a bank must meet before it is permitted to use the Advanced Measurement Approach (AMA) for operational risk capital:

a. Internal and/or external regulators must perform regular reviews of the operational risk management processes and measurement systems. This review must include both the activities of the business units and of the independent operational risk function
b. There must be regular reporting of operational risk exposures and loss experiences to business unit management, senior management and to the board of directors
c. The bank must have an independent operational risk management function that is responsible for the design and implementation of the bank's operational risk framework.
d. The bank's internal operational risk measurement system should not be integrated into the day-to-day risk management processes of the bank but should provide a general overview of the operational risks involved in the processes and operations

90. Which of the following statements is true regarding options' Greeks?

a. Theta tends to be large and positive for at-the-money options.
b. Gamma is greatest for in-the-money options with long times remaining to expiration.
c. Vega is greatest for at-the-money options with long times remaining to expiration.
d. Delta of deep in-the-money put options tends towards +1.

91. According to the Basel Accord's Advanced Measurement Approach, how are operational capital requirements calculated?

a. As in credit risk, there are formulae specified in the Accord so that only the inputs have to be estimated.
b. Capital requirements have to be estimated using historical data bases but the Accord does not specify which statistical distribution has to be used.
c. The formulae are the same as the formulae used to calculate credit risk capital requirements.
d. Each national supervisor must specify the formulae that the banks have to use.

92. Which one of the following statements correctly describes a feature of these different types of exotic options?

a. Compound Options are options on futures.
b. Forward Start Options are specially structured so that they will be out-of-the-money when they start.
c. Shout Options are options with a payoff that depends on the average price of underlying asset.
d. The holders of a Chooser Option can decide whether the option is a call or a put after a specified period of time.

93. Scenario analysis to address operational risk issues can be used:

a. To create scorecards.
b. To fill the data gap resulting from inadequate internal data.
c. Effectively only by considering internal loss data.
d. To complete the data set(s) required to perform Monte Carlo simulations.

94. Your company has reached its credit limit to Ford but Ford is insisting that your firm provide them some increased protection in the event a major project they are undertaking results in some unforeseen liability. Ignoring settlement risk and assuming option premiums are paid immediately at the time of the transaction, which of the following strategies will not give rise to increased credit exposure to Ford?

a. Selling a costless collar to Ford
b. Buying an option from Ford
c. Selling an option to Ford
d. None of the above

95. Albert Henri is the fixed -income manager of a large Canadian pension fund. The present value of the pension fund's portfolio of assets is CAD 4 billion while the expected present value of the fund's liabilities is CAD 5 billion. The respective modified durations are 8.254 and 6.825 years. The fund currently has an actuarial deficit (assets < liabilities) and Albert must avoid widening this gap. There are currently two scenarios for the yield curve: the first scenario is an upward shift of 25 bps, with the second scenario a downward shift of 25 bps. The most liquid interest rate futures contract has a present value of CAD 68,336 and a duration of 2.1468 years. Analyzing both scenarios separately, what should Albert Henry do to avoid widening the pension fund gap? Choose the best option.

a. First Scenario: Do nothing. Second Scenario: Buy 7,559 contracts.
b. First Scenario: Do nothing. Second Scenario: Sell 7,559 contracts.
c. First Scenario: Buy 7,559 contracts. Second Scenario: Do nothing.
d. First Scenario: Do nothing. Second Scenario: Do nothing.

96. The Table below shows the bid/ask quotes by UBS for CDS spreads for companies A, B and C. CSFB has excessive credit exposure to Company C and wants to reduce it through the CDS market.

Company/Years	1 Year	3 Year	5 Year
A	15/25	21/32	27/36
B	43/60	72/101	112/152
C	71/84	93/113	141/170

Since the farthest maturity of its exposure to C is 3 years, CSFB buys a USD 200 million 3-year protection on C from UBS. In order to make its purchase of this protection cheaper, based on its views on companies A and B, CSFB decides to sell USD 300 million 5-year protection on Company A and to sell USD 100 million 1-year protection on Company B to UBS. What is the net annual premium payment made by CSFB to UBS in the first year?

a. USD 1.02 million
b. USD 0.18 million
c. USD 0.58 million
d. USD 0.62 million

97. Goldman Sachs and Venture Fund have signed an ISDA master netting agreement covering their derivative transactions. At the time of the Venture Fund's default the following transactions were outstanding between the two firms:

I. Interest swaps with a positive replacement value of USD 10mm in favor of Goldman Sachs
II. Option transaction with a positive replacement value of USD 6mm in favor of the Venture Fund
III. One remaining interest exchange under a swap where Goldman Sachs owes a fixed payment of USD 1mm and the Venture Fund owes a floating payment of USD 800,000
IV. Goldman Sachs has an outstanding mortgage loan of USD 3mm secured by the property plant and equipment belonging to the Venture Fund.

Under the swap agreement, Goldman Sachs credit risk exposure to the Venture Fund is:

a. USD 10.8mm
b. USD 4mm
c. USD 3.8mm
d. USD 0.08mm

98. Which of the following arguments is false?

Key Risk Indicators should:

a. Be based upon historical loss data
b. Be an objective measure of operational risk
c. Anticipate operational risks
d. Be monitored over time to detect trends

99. In Merton's model, the marginal probability of default _____ with maturity for companies with a high initial credit rating and _____ with maturity for companies with a low initial credit ratings.

a. increases, increases
b. increases, decreases
c. decreases, increases
d. decreases, decreases

100. The risk management function should never be responsible for which of the following tasks?

I. The approval of pricing models and valuation systems used by front office personnel
II. The design of stress scenarios to measure the impact of market conditions, however improbable, that might cause market gaps, volatility swings, or disruptions of major relationships, or might reduce liquidity in the face of unfavorable market linkages, concentrated market making, or credit exhaustion
III. The design of revenue reports quantifying the contribution of various risk components, and of market risk measures such as value at risk
IV. Executing structured transactions in the absence of properly trained sales persons

a. I, II and IV
b. I, II and III
c. IV only
d. I, III and IV

101. A firm's assets are currently valued at $500 million and its current liabilities are $300 million. The standard deviation of asset values is $80 million. The firm has no other debt. What will be the approximate distance to default using the KMV calculation?

a. 2 standard deviations
b. 2.5 standard deviations
c. 6.25 standard deviations
d. Cannot be determined

102. Consider 3 random variables: X, Y, Z. Suppose Corr(X,Y) = 0.4 and Corr(Z,Y) = 0.3, which of the following statements is true:

a. Corr(X,Z) cannot be 0
b. Corr(X,Z) has to be larger than 0.3
c. Corr(X,Z) cannot be negative
d. None of the above

103. In determining the amount of credit risk in a derivatives transaction, credit risk managers will generally use a combination of three factors. Which of the following factors are used?

I. Notional principal amount of the underlying transaction
II. Current exposure – the current cost of finding a replacement for the existing counterparty
III. Potential exposure
IV. Peak exposure – the replacement cost in a worst case scenario

a. I and II
b. I, III and IV
c. III and IV
d. II, III and IV

104. Shell Oil has borrowed USD 100 million from BBVA at a fixed rate of 9%. To hedge its exposure, BBVA enters into a Total Return Swap whereby it will pay the interest on the loan in exchange for LIBOR plus 30 basis points. What is the net cash flow for BBVA if, on the first settlement date, the market value of the loan has increased by 1% and the LIBOR rate is 8.70%?

a. Net cash outflow of USD 1 million
b. Net cash inflow of USD 1 million
c. 0
d. USD 555,000

105. You are considering an investment in one of three different bonds. Your investment guidelines require that any bond you invest in carry an investment grade rating from at least 2 recognized bond rating agencies. Which, if any, of the bonds listed below would meet your investment guidelines?

a. Bond A carries an S&P rating of BB and a Moody's rating of Baa
b. Bond B carries an S&P rating of BBB and a Moody's rating of Ba
c. Bond C carries an S&P rating of BBB and a Moody's rating of Baa
d. None of the above

106. A portfolio manager is considering adding a planned amortization class (PAC) mortgage derivative to his portfolio with the prepayment PAC bands set at 50% PSA and 250% PSA . Which of the following is true?

I. Prepayment uncertainty is limited and transferred to the PAC's companion bonds providing a lower exposure to prepayment risk
II. The PAC's prepayment option is analogous to a put option as it offers protection to investors
III. The PAC is priced at the same spread to Treasuries as its companion bonds
IV. Because the prepayment bands are set so far apart, if prepayments over a long period are outside the bands there will be no noticeable effect on the CMO or its companion bonds

a. I and III
b. I and IV
c. II, III and IV
d. II and III

107. According to the pure expectations hypothesis, which of the following statements is correct concerning the expectations of market participants in an upward-sloping yield curve environment?

a. Interest rates will increase and the yield curve will flatten
b. Interest rates will increase and the yield curve will steepen
c. Interest rates will decrease and the yield curve will flatten
d. Interest rates will decrease and the yield curve will steepen

108. Which of the following would cause a downward-sloping yield curve?

I. An investor preference for short-term instruments
II. An expected decline in interest rates
III. Material credit risk concerns
IV. An expected increase in the inflation rate

a. I, II and III
b. II and III
c. II only
d. IV only

109. BNP Paribas has just entered into a plain-vanilla interest-rate swap as a pay-fixed counterparty. Credit Agricole is the receive-fixed counterparty in the same swap. The forward spot curve is upward-sloping. If LIBOR starts trending down and the forward spot curve flattens, the credit risk from the swap will:

a. Increase only for BNP Paribas.
b. Increase only for Credit Agricole.
c. Decrease for both BNP Paribas and Credit Agricole.
d. Increase for both BNP Paribas and Credit Agricole.

110. Which of the following methodologies would be most appropriate for stress testing your portfolio?

a. Delta-gamma valuation
b. Full revaluation
c. Marked to market
d. Delta-normal VAR

111. Which of the following statement(s) is/are TRUE?

I. The median measures the center of gravity of a population
II. Skewness measures the degree of departure from symmetry
III. A leptokurtic distribution has a lower probability of an extreme value than the normal distribution
IV. A symmetric distribution with 6% of area under the curve falling more than 2 standard deviations from the mean has fatter tails compared with the normal distribution

a. II only
b. I and II only
c. II and IV only
d. I, II and III only

112. A corporate bond will mature in three years. The marginal probability of default in year one is 0.03%. The marginal probability of default in year two is 0.04%. The marginal probability of default in year three is 0.06%. What is the cumulative probability that default will occur during the three year period?

a. 12.47%
b. 12.76%
c. 13.00%
d. 13.55%

113. Consider a 20-year annual coupon bond having a DV01 of 0.16243. A portfolio manager wants to hedge this position using a 10-year annual coupon bond that has a DV01 of 0.14131. If the relative change in yield levels between these two instruments captured by the yield beta is 0.87, which of the following more accurately describes the hedging strategy?

a. The 10-year bond is more sensitive to interest rate changes than the 20-year bond.
b. Shorting the equivalent amount of par value of the 10-year bond for every USD 1 par of the 20-year bond constitutes a perfect hedge.
c. Shorting USD 0.7569 of par of the 10-year bond for every $1 par of the 20-year bond constitutes a perfect hedge.
d. No combination of the two bonds will constitute a perfect hedge because the durations of the two bonds are different.

114. Tim Brown and Steve Parker undertake trades that generate profits of USD 5 million and USD 6 million, respectively. Both trades have face amounts of USD 100 million. Brown trades mortgage-backed securities, with a volatility of 14 percent. Parker trades asset-backed securities, which have a volatility of 16 percent. Based on a 99 percent confidence level RAROC (risk-adjusted return on capital), whose investment is superior?

a. Brown
b. Parker
c. Same
d. Cannot be determined from the information given

115. A bank has USD 100 million in assets and USD 80 million in liabilities. In order to macro-hedge its balance sheet the bank selects a swap that has fixed-rate payments with a duration of 6 years and floating-rate payments with a duration of 2 years. If the optimal notional amount of the swap is determined to be USD 160 million and the duration of the liabilities is 2 years, what is the duration of the bank's assets?

a. 5 years
b. 7 years
c. 8 years
d. 9 years

116. You are using the Merton model (Black-Scholes model for options on a stock paying a dividend yield) to price a European option on foreign exchange. The underlying is the AUD/CAD spot exchange rate quoted as 1.35 AUD per 1.00 CAD(1.35 AUD/CAD). If the AUD and CAD risk free rates are 2.4% and 2%, respectively, what would the rate inputs be in the Merton model for the risk free rate and dividend yield?

a. Risk free rate = 2%, Dividend yield = 2.4%
b. Risk free rate = 2%, Dividend yield = 2%
c. Risk free rate = 2.4%, Dividend yield = 2.4%
d. Risk free rate = 2.4%, Dividend yield = 2%

117. If an investor holds a 5-year IBM bond, it will give him a return very close to the return of the following position:

a. A 5 year IBM credit default swap on which he pays fixed and receives a payment in the event of default.
b. A 5 year IBM credit default swap on which he receives fixed and makes a payment in the event of default.
c. A 5 year US Treasury bond plus a 5 year IBM credit default swap on which he pays fixed and receives a payment in the event of default.
d. A 5 year US Treasury bond plus a 5 year IBM credit default swap on which he receives fixed and makes a payment in the event of default.

118. When determining the standard deviation of value due to credit quality changes for a single exposure, the CreditMetrics model uses three primary factors. Which of the following is not one of the factors used in this model?

a. Credit Rating
b. Seniority
c. Equity Price
d. Credit Spread

119. Government insurance of bank deposits provides banks with an incentive to engage in higher risk business activities. This incentive creates:

a. An insurance arbitrage
b. An insurance fraud
c. A moral hazard
d. A moral risk

120. Which of the following statements about the Basel II capital requirements is false?

a. It increases the risk sensitivity of minimum capital requirements for internationally active banks.
b. It only addresses Credit Risk and Market Risk.
c. United States insurance companies are not required to comply with Basel II capital requirements.
d. Banks are not allowed to use their internal models for credit risk in determining the capital requirements for credit risk.

END OF 2007 FRM PRACTICE EXAM III

2007 FRM Practice Exam III
Answer Key

81.	●	b.	c.	d.	101.	a.	●	c.	d.
82.	a.	b.	●	d.	102.	a.	b.	c.	●
83.	●	b.	c.	d.	103.	a.	b.	c.	●
84.	a.	b.	●	d.	104.	●	b.	c.	d.
85.	a.	●	c.	d.	105.	a.	b.	●	d.
86.	a.	b.	●	d.	106.	a.	●	c.	d.
87.	a.	b.	●	d.	107.	●	b.	c.	d.
88.	a.	b.	●	d.	108.	a.	b.	●	d.
89.	a.	b.	c.	●	109.	a.	●	c.	d.
90.	a.	b.	●	d.	110.	a.	●	c.	d.
91.	a.	●	c.	d.	111.	a.	b.	●	d.
92.	a.	b.	c.	●	112.	●	b.	c.	d.
93.	a.	●	c.	d.	113.	a.	●	c.	d.
94.	a.	b.	●	d.	114.	a.	●	c.	d.
95.	●	b.	c.	d.	115.	a.	b.	●	d.
96.	●	b.	c.	d.	116.	●	b.	c.	d.
97.	a.	b.	●	d.	117.	a.	b.	c.	●
98.	a.	b.	●	d.	118.	a.	b.	●	d.
99.	a.	●	c.	d.	119.	a.	b.	●	d.
100.	a.	b.	●	d.	120.	a.	●	c.	d.

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2007 FRM Practice Exam III
Answers & Explanations

81. An option on a stock has a payoff equal to the square of the positive excess of the stock price over the exercise price at expiration only if the stock exhibits an annual growth rate of 15% or more every year. Given the following assumptions and using a three-step binomial model and rounding to the nearest USD, which of the following would be the option's price?

- Time to expiration is three years.
- Current price is USD10.
- The annual standard deviation is 15%.
- The risk-free interest rate is 5% per year.
- The strike price is USD10.
- Assume the stock pays no dividends.

a. USD 7
b. USD 8
c. USD 9
d. USD 10

CORRECT: A

Using the given information, we can calculate

*u = exp(sigma * sqrt(t)) = exp(0.15 * 1.0) = 1.162*
*d = exp(-sigma * sqrt(t)) = exp(-0.15) = 0.861*
*p = (exp(r * t) - d) / (u - d) = (exp(0.05 * 1) - 0.861) / (1.162 - 0.861) = 0.633*

The option only pays if the stock exhibits an annual growth rate of 15% or more every year, so we only need to consider the top path of the tree.

*Option price = exp(-r * t) * p^3 * (current_price * 1.162^3 - strike_price) = exp(-0.05 * 3) * 0.633^3 * (10 * 1.162^3 - 10)^2 = 7.04*

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 11.

INCORRECT: B, C & D
Note that the option only pays if the stock exhibits an annual growth rate of 15%, so we only need to consider the top path of the tree.

82. For a market variable S, the GARCH (1,1) model is defined as:

$$\sigma_n^2 = \gamma * V_L + \alpha * u_{n-1}^2 + \beta * \sigma_{n-1}^2$$

where

σ_n = estimate made at end of day n - 1 for day n
V_L = long-run average variance rate
γ = weight assigned to V_L
u_{n-1} = percentage change in S between end of day (n–2) and end of day (n–1)
α = weight assigned to u_{n-1}^2
σ_{n-1} = estimate made at end of day (n–2) for day (n–1)
β = weight assigned to σ_{n-1}^2

What is the annualized volatility for a five days option starting from day n by GARCH(1,1) based on the following listed parameters?

$V_L = 0.000055$
$\alpha = 0.013$
$\beta_2 = 0.75$
$\sigma_n = 0.00006$

a. 0.09%
b. 2.91%
c. 12.10%
d. 192%

CORRECT: C

The expected variance rate k days from day n is:

$$E\left[\sigma_{n+k}^2\right] = V_L + (\alpha + \beta)^k * \left(\sigma_n^2 - V_L\right)$$

So,

$\sigma_{n\ k}^{k} = 0.00006000,$
$\sigma_{n+1\ k} = 0.00005882,$
$\sigma_{n+2\ k} = 0.00005791,$
$\sigma_{n+3\ k} = 0.00005722,$
$\sigma_{n+4} = 0.00005669,$

*The average variance rate over the next 5 days is (1/5) * (0.00006000 + 0.00005882 + 0.00005791 + 0.00005722 + 0.00005669) = 0.00005813.*

*And the estimated annualized volatility is: SQRT(0.00005813) * SQRT(252) = 12.10%.*

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 19.

INCORRECT: A
This solution incorrectly multiplies the expected variance rate by the square root of 252; to get the annualized volatility, the square root of the expected variance rate is multiplied by the square root of 252.

INCORRECT: D
This solution incorrectly multiplies the square root of the expected variance rate by 252; to get the annualized volatility, the square root of the expected variance rate is multiplied by the square root of 252.

83. Company X owns a property with a book value of €80,000. There is a buyer willing to pay €200,000 for the property. However, Company X must also provide the buyer with a put option to sell the property back to Company X for €200,000 at the end of 2 years. Moreover, Company X agrees to pay the buyer €40,000 for a call option to repurchase the property for €200,000 at the end of 2 years. In effect, with this transaction Company X "borrows" money from the buyer. What is the annually compounded interest rate per year on this implied loan?

a. 11.80%
b. 25.00%
c. 41.40%
d. Cannot be determined.

CORRECT: A

If the property is worth less than €200,000 at the end of the 2 years, then the buyer's put option will be 'in the money' and the buyer will sell back the property to Company X. If the property is worth more than €200,000 at the end of the 2 years, then Company X's call option will be 'in the money' and Company X will repurchase the property from the buyer. In either case, Company X repurchases the property for €200,000 at the end of the 2 years. In effect, Company X has borrowed €160,000 (€200,000 purchase price received from the buyer less the €40,000 paid to the buyer for the call option) at time 0 and must repay €200,000 at the end of 2 years. Therefore,

$160,000 \times (1 + i)^2 = 200,000$

So, the interest rate (i) is 11.8 % per year.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 1.

INCORRECT: B
This answer incorrectly assumes a one-year horizon.

INCORRECT: C
This answer incorrectly assumes Company X borrows €80,000 and repays €160,000
.
INCORRECT: D
The interest rate can be calculated from the data provided.

84. If a European call option is written on a dividend paying stock, an increase in which of the following will not automatically result in an increased option price?

a. The stock price.
b. The risk-free rate.
c. The time to expiration.
d. The volatility of the stock price.

CORRECT: C

If a very large dividend is expected between the original time to expiration and the new time to expiration, the short-life call option could be worth more than the long-life option since paying the dividend will cause the stock price to decline.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 9.

INCORRECT: A
Regardless of the dividend, call options become more valuable as the stock price increases.
INCORRECT: B
Regardless of the dividend, call options become more valuable as the risk-free rate increases.
INCORRECT: D
Regardless of the dividend, call options become more valuable as the volatility increases.

85. Company B makes a bid for Company A at € 15 per share. Although the bid may or may not ultimately be successful, the price of Company A jumps because of the bid. A merger arbitrage manager acquires a long position in Company A and a short position in Company B. When constructing the variance-covariance matrix used for the VaR calculation, which of the following is the best choice among the following alternatives when computing the volatility of the companies and their correlations?

a. EWMA volatility, EWMA correlation
b. EWMA volatility, Equal weight correlation
c. Equal weight volatility, EWMA correlation
d. Equal weight volatility, Equal weight correlation

CORRECT: B

EWMA volatility estimate captures the higher volatility of Company A's price following the price jump. Since equal weight correlation would provide a longer view of the correlation, this estimate would be preferred to the higher correlation provided by EWMA, particularly in the event that the deal falls through.

Reference: Philippe Jorion, Value At Risk, 3rd ed. Chapter 9.

INCORRECT: A
Since equal weight correlation would provide a longer view of the correlation, this estimate would be preferred to the higher correlation provided by EWMA, particularly in the event that the deal falls through.
INCORRECT: C
The equal weight volatility estimate would not capture the higher volatility of Company A's price following the price jump. Since equal weight correlation would provide a longer view of the correlation, this estimate would be preferred to the higher correlation provided by EWMA, particularly in the event that the deal falls through.
INCORRECT: D
The equal weight volatility estimate would not capture the higher volatility of Company A's price following the price jump.

86. Which of the following causes led Metallgesellschaft Refining and Marketing Inc (MGRM) into severe financial distress?

I. There was a mismatch of cash flows from hedge and physical transactions
II. MGRM failed to consider hedging market risk from fixed price physical sales contracts
III. MGRM held a great percentage of the total open interest on the NYMEX
IV. The futures market went from backwardation to contango

a. I and III
b. I and IV
c. I, III and IV
d. II, III and IV

CORRECT: C

Although there are arguments that lead to many different causes, statements I, III and IV are causes strongly related to the greater than $1 billion losses: the cash flow mismatch is evident; the large percentage of the total open interest on NYMEX made the hasty unwinding of such positions much harder; and the market movement to contango made rollover costly through the increase in margin requirements.

Reference: Reto Gallati, Risk Management and Capital Adequacy. Chapter 6.

INCORRECT: A
Both I and III were causes of MGRM's problem, but not the only causes.
INCORRECT: B
Both I and IV were causes of MGRM's problem, but not the only causes.
INCORRECT: D
Statement II is false because MGRM willingly transferred away its market risk but not its liquidity and other risks.

87. Under the Internal Ratings Based approach of Basel II, inputs are set by the Basel Committee or the bank which has adopted that approach. Which of the following inputs is always set by the bank?

a. Asset correlation
b. Confidence level
c. Probabilities of default
d. Loss given default

CORRECT: C

Under the Internal Ratings Based approach, the bank sets the probability of default, but not the asset correlation, the confidence level or the loss given default.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

88. Consider a two-asset portfolio. The portfolio weight of Asset A is 0.6 and the portfolio weight of Asset B is 0.4. The value of the total portfolio is USD1 million and its standard deviation of its decimal return is 0.060606. If the betas of Asset A and Asset B are 0.8 and 1.3 respectively, the respective marginal VAR of Asset A and the component VAR of Asset B at a 95% confidence level are closest to:

a. USD 0.80 and USD 52,000
b. USD 0.80 and USD 48,000
c. USD 0.08 and USD 52,000
d. USD 0.08 and USD 48,000

CORRECT: C

Diversified VAR (DVAR) = z x Std Dev x Portfolio Value
= 1.95 x 0.060606 x 1,000,000 = $99,999.90

Marginal VAR of Asset A = DVAR x β_A / Portfolio Value
= 99,999.90 x 0.8 / 1,000,000 = $0.08

Component VAR of Asset B = DVAR x β_B x Weight of Asset B
= 99,999.90 x 1.3 x 0.4
= $52,000

Reference: Philippe Jorion, Value at Risk, 3rd ed. Chapter 7.

INCORRECT: A
This solution incorrectly calculates the marginal VaR of asset A.
INCORRECT: B
This solution incorrectly calculates both the marginal VaR of asset A and the component VaR of asset B.
INCORRECT: D
This solution incorrectly calculates the component VaR of asset B.

89. According to the Basel Committee which of the options below is **NOT** a qualitative standard that a bank must meet before it is permitted to use the Advanced Measurement Approach (AMA) for operational risk capital:

a. Internal and/or external regulators must perform regular reviews of the operational risk management processes and measurement systems. This review must include both the activities of the business units and of the independent operational risk function
b. There must be regular reporting of operational risk exposures and loss experiences to business unit management, senior management and to the board of directors
c. The bank must have an independent operational risk management function that is responsible for the design and implementation of the bank's operational risk framework.
d. The bank's internal operational risk measurement system should not be integrated into the day-to-day risk management processes of the bank but should provide a general overview of the operational risks involved in the processes and operations

CORRECT: D

'D' is not a qualitative standard. According to the Basel Committee, a "bank's internal operational risk measurement system must be closely integrated into the day-to-day risk management processes of the bank. Its output must be an integral part of the process of monitoring and controlling the bank's operational risk profile."

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

90. Which of the following statements is true regarding options' Greeks?

a. Theta tends to be large and positive for at-the-money options.
b. Gamma is greatest for in-the-money options with long times remaining to expiration.
c. Vega is greatest for at-the-money options with long times remaining to expiration.
d. Delta of deep in-the-money put options tends towards +1.

CORRECT: C

Vega is the rate of change in the price of an option with respect to changes in the volatility of the underlying asset. Vega is greatest for at-the-money options with long times remaining to expiration.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 15.

INCORRECT: A
Theta is the rate of change of the value of a portfolio with respect to the passage of time. Theta is negative (in some cases very negative) for at-the-money options.
INCORRECT: B
Gamma is the rate of change of the value of a portfolio's delta with respect to changes in the price of the underlying assets. Gamma is greatest for at-the-money options with little time remaining to expiration.
INCORRECT: D
Delta is the rate of change in the price of an option with respect to changes in the price of the underlying asset. Delta for put options are negative, and tend toward -1 for deep in-the-money put options.

91. According to the Basel Accord's Advanced Measurement Approach, how are operational capital requirements calculated?

a. As in credit risk, there are formulae specified in the Accord so that only the inputs have to be estimated.
b. Capital requirements have to be estimated using historical data bases but the Accord does not specify which statistical distribution has to be used.
c. The formulae are the same as the formulae used to calculate credit risk capital requirements.
d. Each national supervisor must specify the formulae that the banks have to use.

CORRECT: B
The Advanced Measurement Approach allows banks to estimate capital requirements using their own internal models.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

92. Which one of the following statements correctly describes a feature of these different types of exotic options?

a. Compound Options are options on futures.
b. Forward Start Options are specially structured so that they will be out-of-the-money when they start.
c. Shout Options are options with a payoff that depends on the average price of underlying asset.
d. The holders of a Chooser Option can decide whether the option is a call or a put after a specified period of time.

CORRECT: D
The holder of a chooser option can choose whether the option is a call or a put after a specified period of time.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 22.

INCORRECT: A
Compound options are options on options.
INCORRECT: B
Forward start options are options that will start at some time in the future.
INCORRECT: C
A shout option is a European options where the holder can "shout" to the seller one time during the life of the option. At maturity, the holder gets the greater of the current value of the European option or the intrinisic value at the time of the "shout".

93. Scenario analysis to address operational risk issues can be used:

a. To create scorecards.
b. To fill the data gap resulting from inadequate internal data.
c. Effectively only by considering internal loss data.
d. To complete the data set(s) required to perform Monte Carlo simulations.

CORRECT: B

For low frequency events, such as client lawsuits in corporate finance, a very long observation period may be required meaning that in practice the required parameters cannot be directly determined – scenario analysis can create such synthetic data to fill the gap.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

94. Your company has reached its credit limit to Ford but Ford is insisting that your firm provide them some increased protection in the event a major project they are undertaking results in some unforeseen liability. Ignoring settlement risk and assuming option premiums are paid immediately at the time of the transaction, which of the following strategies will not give rise to increased credit exposure to Ford?

a. Selling a costless collar to Ford
b. Buying an option from Ford
c. Selling an option to Ford
d. None of the above

CORRECT: C

Since Ford is paying the option premium upfront, selling an option has no credit risk.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: A
A collar usually involves buying a put option and selling a call option. Buying the put option exposes the company to additional credit risk as Ford (the seller) may default on the obligation.
INCORRECT: B
Buying an option exposes the company to additional credit risk as Ford (the seller) may default on the obligation.

95. Albert Henri is the fixed income manager of a large Canadian pension fund. The present value of the pension fund's portfolio of assets is CAD 4 billion while the expected present value of the fund's liabilities is CAD 5 billion. The respective modified durations are 8.254 and 6.825 years. The fund currently has an actuarial deficit (assets < liabilities) and Albert must avoid widening this gap. There are currently two scenarios for the yield curve: the first scenario is an upward shift of 25 bps, with the second scenario a downward shift of 25 bps. The most liquid interest rate futures contract has a present value of CAD 68,336 and a duration of 2.1468 years. Analyzing both scenarios separately, what should Albert Henry do to avoid widening the pension fund gap? Choose the best option.

a. First Scenario: Do nothing. Second Scenario: Buy 7,559 contracts.
b. First Scenario: Do nothing. Second Scenario: Sell 7,559 contracts.
c. First Scenario: Buy 7,559 contracts. Second Scenario: Do nothing.
d. First Scenario: Do nothing. Second Scenario: Do nothing.

CORRECT: A

The impact of a change in the yield on the value of the assets or liabilities is given by:

$$delta(V) = -V * modified\_duration * delta(yield)$$

So, in the first scenario (yield shifts upward by 25 bps), asset and liability values would decrease in value:

$$delta(assets) = -4,000,000,000 * 8.254 * 0.0025 = -82,540,000$$
$$delta(liabilities) = -5,000,000,000 * 6.825 * 0.0025 = -85,312,500$$

Since the liability decrease is greater, nothing should be done.

In the second scenario (yield shifts downward by 25 bps), asset and liability values would increase by 82,540,000 and 85,312,500, respectively, which would widen the pension fund gap so some hedging would be needed. The amount to be hedged is 85,312,500 - 82,540,000 = 2,772,500.

Since the futures contract would increase in value as the yield shifts downward, Albert should BUY these contracts and the number to buy is given by:

$$N = 2,772,500 / (-68,336 * 2.1468 * -0.0025) = 7,559$$

Reference: Philippe Jorion, Value at Risk, 3rd ed. Chapter 17.

INCORRECT: B
In the second scenario (yield shifts downward by 25 bps), the pension fund gap widens so some hedging would be needed, and since the futures contract would increase in value as the yield shifts downward, Albert should BUY these contracts.
INCORRECT: C
In the first scenario (yield shifts upward by 25 bps), the pension fund gap decreases so no hedging is needed. In the second scenario (yield shifts downward by 25 bps), the pension fund gap widens so some hedging would be needed
INCORRECT: D
In the second scenario (yield shifts downward by 25 bps), the pension fund gap widens so some hedging would be needed.

96. The Table below shows the bid/ask quotes by UBS for CDS spreads for companies A, B and C. CSFB has excessive credit exposure to Company C and wants to reduce it through the CDS market.

Company/Years	1 Year	3 Year	5 Year
A	15/25	21/32	27/36
B	43/60	72/101	112/152
C	71/84	93/113	141/170

Since the farthest maturity of its exposure to C is 3 years, CSFB buys a USD 200 million 3-year protection on C from UBS. In order to make its purchase of this protection cheaper, based on its views on companies A and B, CSFB decides to sell USD 300 million 5-year protection on Company A and to sell USD 100 million 1-year protection on Company B to UBS. What is the net annual premium payment made by CSFB to UBS in the first year?

a. USD 1.02 million
b. USD 0.18 million
c. USD 0.58 million
d. USD 0.62 million

CORRECT: A

For protection bought, CSFB must pay the ask price quoted; for protection sold, CSFB receives the buy price quoted.

*For the protection on C bought, CSFB pays 200 * 0.0113 = 2.26 million.*
*For the protection on A and B sold, CSFB receives 300 * 0.0027 + 100 * 0.0043 = 1.24 million. The net annual premium payment paid by CSFB in the first year is 1.02 million.*

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: B
This answer incorrectly assumes that for protection bought, CSFB pays the buy price quoted and for protection sold, CSFB receives the ask price quoted.
INCORRECT: C
This answer incorrectly assumes that for protection sold, CSFB receives the ask price quoted.
INCORRECT: D
This answer incorrectly assumes that for protection bought, CSFB pays the buy price quoted.

97. Goldman Sachs and Venture Fund have signed an ISDA master netting agreement covering their derivative transactions. At the time of the Venture Fund's default the following transactions were outstanding between the two firms:

I. Interest swaps with a positive replacement value of USD 10mm in favor of Goldman Sachs
II. Option transaction with a positive replacement value of USD 6mm in favor of the Venture Fund
III. One remaining interest exchange under a swap where Goldman Sachs owes a fixed payment of USD 1mm and the Venture Fund owes a floating payment of USD 800,000
IV. Goldman Sachs has an outstanding mortgage loan of USD 3mm secured by the property plant and equipment belonging to the Venture Fund.

Under the swap agreement, Goldman Sachs credit risk exposure to the Venture Fund is:

a. USD 10.8mm
b. USD 4mm
c. USD 3.8mm
d. USD 0.08mm

CORRECT: C

The ISDA master netting agreement covering the derivative transactions would include netting of (I), (II) and (III), but not (IV). Therefore, the total net value to Goldman Sachs is: 10 - 6 - 1 + 0.8 = 3.8mm.

Reference: Gunter Meissner, Credit Derivatives. Chapter 2.

INCORRECT: A
This answer only includes the total replacement value in favor of Goldman Sachs. The effect of netting has not been included.
INCORRECT: B
This answer only includes the netting of (I) and (II). The ISDA master netting agreement would also include netting (III).
INCORRECT: D
This answer incorrectly includes netting of (IV); mortgage agreements would not be net under the ISDA master netting agreement.

98. Which of the following arguments is false?

Key Risk Indicators should:

a. Be based upon historical loss data
b. Be an objective measure of operational risk
c. Anticipate operational risks
d. Be monitored over time to detect trends

CORRECT: C

Key risk indicators seek to quantify all aspects that are sought by the risk manager to enable risk-based decision making. They serve as a gauge of potential downside outcomes. When applied risk key indicators are used to identify important business vulnerabilities. The operational risk profile using the risk indicators should be continually monitored, dynamic, and updated as often as new data (based on historical losses for example) are collected. Key risk indicators are based on historical loss data, are monitored over time to detect trends, and need to be an objective measure of operational risk. Key risk indicators do not anticipate operational risk.

Reference: Kalyvas and Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals. Chapter 3.

99. In Merton's model, the marginal probability of default _____ with maturity for companies with a high initial credit rating and _____ with maturity for companies with a low initial credit ratings.

a. increases, increases
b. increases, decreases
c. decreases, increases
d. decreases, decreases

CORRECT: B
The increase for high credit rating is due to a mean reversion effect and the decrease for low credit ratings is due to the survival effect. The fortunes of an Aaa-rated firm can only stay the same at best, but will often deteriorate, while a B-rated firm that has survived the first few years must have a decreasing probability of defaulting as time goes by.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 6.

INCORRECT: A
For companies with a low initial credit rating, maturity decreases the probability of default due to the survival effect.
INCORRECT: C
For companies with a high initial credit rating, maturity increases the probability of default due to mean reversion. For companies with a low initial credit rating, maturity decreases the probability of default due to the survival effect
INCORRECT: D
For companies with a high initial credit rating, maturity increases the probability of default due to mean reversion.

100. The risk management function should never be responsible for which of the following tasks?

I. The approval of pricing models and valuation systems used by front office personnel
II. The design of stress scenarios to measure the impact of market conditions, however improbable, that might cause market gaps, volatility swings, or disruptions of major relationships, or might reduce liquidity in the face of unfavorable market linkages, concentrated market making, or credit exhaustion
III. The design of revenue reports quantifying the contribution of various risk components, and of market risk measures such as value at risk
IV. Executing structured transactions in the absence of properly trained sales persons

a. I, II and IV
b. I, II and III
c. IV only
d. I, III and IV

CORRECT: C

The risk management function cannot execute transactions (IV) due to potential conflict of interest.

Model and methodology approval (I), stress testing (II) and establishment of risk management procedures (III) are responsibilities of risk management.

Reference: René Stulz, Risk Management & Derivatives. Chapter 3.

INCORRECT: A
Model and methodology approval (I) and stress testing (II) are responsibilities of risk management.

INCORRECT: B
Model and methodology approval (I), stress testing (II) and establishment of risk management procedures (III) are responsibilities of risk management.

INCORRECT: D
Model and methodology approval (I) and establishment of risk management procedures (III) are responsibilities of risk management.

101. A firm's assets are currently valued at $500 million and its current liabilities are $300 million. The standard deviation of asset values is $80 million. The firm has no other debt. What will be the approximate distance to default using the KMV calculation?

a. 2 standard deviations
b. 2.5 standard deviations
c. 6.25 standard deviations
d. Cannot be determined

CORRECT: B

Using the KMV calculation,

Distance to default = (asset value - liability value) / (standard deviation of asset value) = (500 - 300) / 80 = 2.5

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 6.

102. Consider 3 random variables: X, Y, Z. Suppose Corr(X,Y) = 0.4 and Corr(Z,Y) = 0.3, which of the following statements is true:

a. Corr(X,Z) cannot be 0
b. Corr(X,Z) has to be larger than 0.3
c. Corr(X,Z) cannot be negative
d. None of the above

CORRECT: D

The correlation matrix between X, Y, and Z is a valid correlation matrix if each of the pairwise correlation takes a value between -1 and 1 and the matrix is symmetric and positive semi-definite. Conditions specified in a, b, and c are not necessary.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 19.

INCORRECT: A
The correlation matrix between X, Y, and Z is a valid correlation matrix if each of the pairwise correlation takes a value between -1 and 1 and the matrix is symmetric and positive semi-definite. For the values given, Corr(X,Z) = 0 is feasible.
INCORRECT: B
The correlation matrix between X, Y, and Z is a valid correlation matrix if each of the pairwise correlation takes a value between -1 and 1 and the matrix is symmetric and positive semi-definite. For the values given, Corr(X,Z) does not have to be greater than 0.3.
INCORRECT: D
The correlation matrix between X, Y, and Z is a valid correlation matrix if each of the pairwise correlation takes a value between -1 and 1 and the matrix is symmetric and positive semi-definite. For the values given, Corr(X,Z) could be negative.

103. In determining the amount of credit risk in a derivatives transaction, credit risk managers will generally use a combination of three factors. Which of the following factors are used?

I. Notional principal amount of the underlying transaction
II. Current exposure – the current cost of finding a replacement for the existing counterparty
III. Potential exposure
IV. Peak exposure – the replacement cost in a worst case scenario

a. I and II
b. I, III and IV
c. III and IV
d. II, III and IV

CORRECT: D

Current exposure, potential exposure and peak exposure are the primary factors used to measure credit risk in derivative transactions.

Although the notional amounts of transactions are used to determine the amount of the underlying credit risk in derivative transactions, the notional principal in and of itself is not a meaningful measurement of risk.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

INCORRECT: A
Although the notional amounts of transactions are used to determine the amount of the underlying credit risk in derivative transactions, the notional principal in and of itself is not a meaningful measurement of risk.
INCORRECT: B
Although the notional amounts of transactions are used to determine the amount of the underlying credit risk in derivative transactions, the notional principal in and of itself is not a meaningful measurement of risk.
INCORRECT: C
Current exposure is used to determine the amount of the underlying credit risk in derivative transactions.

104. Shell Oil has borrowed USD 100 million from BBVA at a fixed rate of 9%. To hedge its exposure, BBVA enters into a Total Return Swap whereby it will pay the interest on the loan in exchange for LIBOR plus 30 basis points. What is the net cash flow for BBVA if, on the first settlement date, the market value of the loan has increased by 1% and the LIBOR rate is 8.70%?

a. Net cash outflow of USD 1 million
b. Net cash inflow of USD 1 million
c. 0
d. USD 555,000

CORRECT: A

In a total return swap, BBVA must pay the interest on the loan in exchange for LIBOR plus 30 bps. In addition, BBVA must pay the change in value of the asset if it goes up (and would receive the change in value of the asset if it goes down).

In this scenario,
BBVA payments are: 9% + 1% = 10%
BBVA receives: 8.70% + 0.30% = 9%

So, the net flow to BBVA is an outflow of 1%, or USD 1 million.

Reference: Gunter Meissner, Credit Derivatives. Chapter 2.

INCORRECT: B
In a total return swap, BBVA must pay the interest on the loan in exchange for LIBOR plus 30 bps. In addition, BBVA must pay the change in value of the asset if it goes up (and would receive the change in value of the asset if it goes down).
INCORRECT: C
In a total return swap, BBVA must pay the interest on the loan in exchange for LIBOR plus 30 bps. In addition, BBVA must pay the change in value of the asset if it goes up (and would receive the change in value of the asset if it goes down).
INCORRECT: D
In a total return swap, BBVA must pay the interest on the loan in exchange for LIBOR plus 30 bps. In addition, BBVA must pay the change in value of the asset if it goes up (and would receive the change in value of the asset if it goes down).

105. You are considering an investment in one of three different bonds. Your investment guidelines require that any bond you invest in carry an investment grade rating from at least 2 recognized bond rating agencies. Which, if any, of the bonds listed below would meet your investment guidelines?

a. Bond A carries an S&P rating of BB and a Moody's rating of Baa
b. Bond B carries an S&P rating of BBB and a Moody's rating of Ba
c. Bond C carries an S&P rating of BBB and a Moody's rating of Baa
d. None of the above

CORRECT: C

An investment grade bond has an S&P rating BBB or above and a Moody's rating of Baa or above.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 2.

106. A portfolio manager is considering adding a planned amortization class (PAC) mortgage derivative to his portfolio with the prepayment PAC bands set at 50% PSA and 250% PSA . Which of the following is true?

I. Prepayment uncertainty is limited and transferred to the PAC's companion bonds providing a lower exposure to prepayment risk
II. The PAC's prepayment option is analogous to a put option as it offers protection to investors
III. The PAC is priced at the same spread to Treasuries as its companion bonds
IV. Because the prepayment bands are set so far apart, if prepayments over a long period are outside the bands there will be no noticeable effect on the CMO or its companion bonds

a. I and III
b. I and IV
c. II, III and IV
d. II and III

CORRECT: B

Option (I) is correct in that PAC's provide the benefit of a steady expected stream of payments and their companion bonds absorb the risk of prepayment outside the bands, and option (IV) is correct in that a "drift" effect on the bands will take place if the prepayment rate is outside the band over a long period of time. How far apart the bands are set is irrelevant to this concept. The drift arises due to the interaction between the actual cash prepayments and the bands and the changes in collateral balance and the ratio between the PAC and companion nominal values.

Option (II) is not correct in that the prepayment option is similar to a call, not a put, and option (III) is not correct in that companion bonds are priced at a higher spread to Treasuries because of their higher prepayment risk and PACs are priced at a lower spread to Treasuries since the prepayment risk is transferred to the companion bond.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 21.

107. According to the pure expectations hypothesis, which of the following statements is correct concerning the expectations of market participants in an upward-sloping yield curve environment?

a. Interest rates will increase and the yield curve will flatten
b. Interest rates will increase and the yield curve will steepen
c. Interest rates will decrease and the yield curve will flatten
d. Interest rates will decrease and the yield curve will steepen

CORRECT: A

The pure expectations hypothesis implies that the slope of the yield curve indicates the market's expectation for the direction of change of future short term interest rates. Hence, an upward sloping yield curve would suggest that interest rates will increase and the yield curve will flatten.

Reference: Bruce Tuckman, Fixed Income Securities, 2nd ed. Chapter 9.

108. Which of the following would cause a downward-sloping yield curve?

I. An investor preference for short-term instruments
II. An expected decline in interest rates
III. Material credit risk concerns
IV. An expected increase in the inflation rate

a. I, II and III
b. II and III
c. II only
d. IV only

CORRECT: C

Expectations of lower interest rates in the future (II) could cause a downward sloping yield curve.

Investors preference for short-term instruments (I) would lower the yields for short-term instruments which would not cause a downward-sloping yield curve. Credit risk concerns (III) usually lead to upward sloping yield curve since cumulative probability of default increases on a longer-term horizons. And, an expected increase in inflation generally leads to an upward sloping yield curve.

Reference: Bruce Tuckman, Fixed Income Securities, Chapters 4 and 9

INCORRECT: A
Expectations of lower interest rates in the future (II) could cause a downward sloping yield curve. However, investors preference for short-term instruments (I) would lower the yields for short-term instruments which would not cause a downward-sloping yield curve and credit risk concerns (III) usually lead to upward sloping yield curve since cumulative probability of default increases on a longer-term horizons.
INCORRECT: B
Investors preference for short-term instruments (I) would lower the yields for short-term instruments which would not cause a downward-sloping yield curve and credit risk concerns (III) usually lead to upward sloping yield curve since cumulative probability of default increases on a longer-term horizons.
INCORRECT: D
An expected increase in inflation generally leads to an upward sloping yield curve.

109. BNP Paribas has just entered into a plain-vanilla interest-rate swap as a pay-fixed counterparty. Credit Agricole is the receive-fixed counterparty in the same swap. The forward spot curve is upward-sloping. If LIBOR starts trending down and the forward spot curve flattens, the credit risk from the swap will:

a. Increase only for BNP Paribas.
b. Increase only for Credit Agricole.
c. Decrease for both BNP Paribas and Credit Agricole.
d. Increase for both BNP Paribas and Credit Agricole.

CORRECT: B

At the initiation of the swap, the value should be zero to both parties and the credit risk to both is zero. If LIBOR starts to decline, the value will increase to the fixed-rate receiver, which is Credit Agricole. The value to Credit Agricole will probably increase more with the flattening of the spot curve which indicates an expectation of floating rates in the

future. As the value increases to a counterparty, the credit risk increases too. The credit risk of BNP Paribas remains at zero because it is owed nothing.

Reference: Gunter Meissner, Credit Derivatives. Chapter 4.

110. Which of the following methodologies would be most appropriate for stress testing your portfolio?

a. Delta-gamma valuation
b. Full revaluation
c. Marked to market
d. Delta-normal VAR

CORRECT: B

As each scenrio is considered, a full revaluation is the most appropriate approach for stress testing a portfolio.

Reference: Philippe Jorion, Value at Risk, 3rd ed. Chapter 10.

111. Which of the following statement(s) is/are TRUE?

I. The median measures the center of gravity of a population
II. Skewness measures the degree of departure from symmetry
III. A leptokurtic distribution has a lower probability of an extreme value than the normal distribution
IV. A symmetric distribution with 6% of area under the curve falling more than 2 standard deviations from the mean has fatter tails compared with the normal distribution

a. II only
b. I and II only
c. II and IV only
d. I, II and III only

CORRECT: C

Skewness is the scaled third moment and measures degree of departure from symmetry, and a normal distribution has only 5% of area under curve falling 2 standard deviations from mean.

Further, the mean, not the median, measures the center of gravity of a population, and a leptokurtic distribution has kurtosis greater than 3, which means it is more fat-tailed than the normal distribution.

Reference: Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. Chapter 1.

112. A corporate bond will mature in three years. The marginal probability of default in year one is 0.03%. The marginal probability of default in year two is 0.04%. The marginal probability of default in year three is 0.06%. What is the cumulative probability that default will occur during the three year period?

a. 12.47%
b. 12.76%
c. 13.00%
d. 13.55%

CORRECT: A

The cumulative default probability is the probability that a borrower will default over a multiyear period, which is equal to 1.0 minus the probability that there is not a default during the multiyear period.

Cumulative default probability
*= 1- Prob(no default in yr 1) * Prob(no default in yr 2) * Prob(no default in yr 3)*
*= 1 - (1 - 0.03) * (1 - 0.04) * (1 - 0.06)*
*= 1 - (0.97) * (0.96) * (0.94)*
= 12.47%

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 3.

113. Consider a 20-year annual coupon bond having a DV01 of 0.16243. A portfolio manager wants to hedge this position using a 10-year annual coupon bond that has a DV01 of 0.14131. If the relative change in yield levels between these two instruments captured by the yield beta is 0.87, which of the following more accurately describes the hedging strategy?

a. The 10-year bond is more sensitive to interest rate changes than the 20-year bond.
b. Shorting the equivalent amount of par value of the 10-year bond for every USD 1 par of the 20-year bond constitutes a perfect hedge.
c. Shorting USD 0.7569 of par of the 10-year bond for every $1 par of the 20-year bond constitutes a perfect hedge.
d. No combination of the two bonds will constitute a perfect hedge because the durations of the two bonds are different.

CORRECT: B

Calculating the optimal hedge ratio (HR) gives:

*HR = yield beta * (DV01 of the Position / DV01 of the hedging instrument)*
*= 0.87 * (0.16243 / 0.14131)*
= 1.00003 = 1 (approximately)

To completely hedge the position, for every $1 par value of the 20-year bond, we have to short $1 of par of the 10-year bond.

Reference: René Stulz, Risk Management & Derivatives. Chapter 8.

INCORRECT: A
This statement does not describe the hedging strategy.

INCORRECT: C
This answer incorrectly calculates the optimal hedge ratio; the DVO1 of the position is incorrectly set to 0.14131 and the DV01 of the hedging instrument is incorrectly set to 0.16243.
INCORRECT: D
The two bonds can be combined to form a perfect hedge.

114. Tim Brown and Steve Parker undertake trades that generate profits of USD 5 million and USD 6 million, respectively. Both trades have face amounts of USD 100 million. Brown trades mortgage-backed securities, with a volatility of 14 percent. Parker trades asset-backed securities, which have a volatility of 16 percent. Based on a 99 percent confidence level RAROC (risk-adjusted return on capital), whose investment is superior?

a. Brown
b. Parker
c. Same
d. Cannot be determined from the information given

CORRECT: B

Using RAROC, the risk-adjusted performance is calculated by:

RAPM = Profit / (Risk Capital), where
*Risk Capital = Q(c) * sigma * investment level, and*
Q(c) is the quantile of a standard normal distribution at confidence level c.

So,
*RAPM(Tim Brown) = 5 / (2.326 * 0.14 * 100) = 15.4%*
*RAPM(Steve Parker) = 6 / (2.326 * 0.16 * 100) = 16.1%*

Using a 99 percent confidence interval RAROC, Steve Parker's investment performance is superior.

Reference: Crouhy, Galai, and Mark, Risk Management. Chapter 14.

115. A bank has USD 100 million in assets and USD 80 million in liabilities. In order to macro-hedge its balance sheet the bank selects a swap that has fixed-rate payments with a duration of 6 years and floating-rate payments with a duration of 2 years. If the optimal notional amount of the swap is determined to be USD 160 million and the duration of the liabilities is 2 years, what is the duration of the bank's assets?

a. 5 years
b. 7 years
c. 8 years
d. 9 years

CORRECT: C

Notional Amount $= (D_{asset} - (Liab/Assets) \times D_{Liab}) \times Assets) / (D_{fixed} - D_{float})$
$160 = (D_{asset} - (80/100) \times 2) \times 100) / (6 - 2)$
$160 = (100 * D_{asset} - 160) / 4$

So, the duration of the assets, D_{asset}*, is 8 years.*

Reference: Anthony Saunders, Financial Institutions Management, 5th ed. Chapter 27.

116. You are using the Merton model (Black-Scholes model for options on a stock paying a dividend yield) to price a European option on foreign exchange. The underlying is the AUD/CAD spot exchange rate quoted as 1.35 AUD per 1.00 CAD(1.35 AUD/CAD). If the AUD and CAD risk free rates are 2.4% and 2%, respectively, what would the rate inputs be in the Merton model for the risk free rate and dividend yield?

a. Risk free rate = 2%, Dividend yield = 2.4%
b. Risk free rate = 2%, Dividend yield = 2%
c. Risk free rate = 2.4%, Dividend yield = 2.4%
d. Risk free rate = 2.4%, Dividend yield = 2%

CORRECT: A

A foreign currency is analogous to a stock providing a known dividend yield because the owner of the foreign currency receives a "dividend yield" equal to the risk free rate in the foreign currency. We defined the spot exchange rate as the value of one of foreign currency measured in the domestic currency, thus making the AUD the foreign currency.

Reference: John Hull, Options, Futures, and Other Derivatives, 6th ed. Chapter 14.

INCORRECT: B
This answer would be correct if the exchange rate was quoted CAD/AUD and was a futures rate.
INCORRECT: C
This answer would be correct if the exchange rate was a futures rate.
INCORRECT: D
This answer would be correct if the exchange rate was quoted CAD/AUD.

117. If an investor holds a 5-year IBM bond, it will give him a return very close to the return of the following position:

a. A 5 year IBM credit default swap on which he pays fixed and receives a payment in the event of default.
b. A 5 year IBM credit default swap on which he receives fixed and makes a payment in the event of default.
c. A 5 year US Treasury bond plus a 5 year IBM credit default swap on which he pays fixed and receives a payment in the event of default.
d. A 5 year US Treasury bond plus a 5 year IBM credit default swap on which he receives fixed and makes a payment in the event of default.

CORRECT: D

Being long a bond of an issuer is equivalent to buying a Treasury bond and selling credit protection through a CDS.

Reference: René Stulz, Risk Management & Derivatives. Chapter 18.

118. When determining the standard deviation of value due to credit quality changes for a single exposure, the CreditMetrics model uses three primary factors. Which of the following is not one of the factors used in this model?

a. Credit Rating
b. Seniority
c. Equity Price
d. Credit Spread

CORRECT: C

Equity price is not used by the CreditMetrics model in its consideration of credit quality changes.

Reference: Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk. Chapter 6.

119. Government insurance of bank deposits provides banks with an incentive to engage in higher risk business activities. This incentive creates:

a. An insurance arbitrage
b. An insurance fraud
c. A moral hazard
d. A moral risk

CORRECT: C

A moral hazard occurs when one has less incentive to control risk because one has acquired insurance.

Reference: Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach. Chapter 5.

120. Which of the following statements about the Basel II capital requirements is false?

a. It increases the risk sensitivity of minimum capital requirements for internationally active banks.
b. It only addresses Credit Risk and Market Risk.
c. United States insurance companies are not required to comply with Basel II capital requirements.
d. Banks are not allowed to use their internal models for credit risk in determining the capital requirements for credit risk.

CORRECT: B

In addition to addressing capital requirements for credit and market risk, the Basel II capital requirements also address operational risk.

The Basel II capital requirements are more risk-sensitive, apply to internationally active banks which would not include US insurance companies and allow banks to use internal models for credit risk.

Reference: "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version".

End of 2007 FRM Practice Exam III

Answers & Explanations