2008 FRM® Practice EXAMS

GARP
GLOBAL ASSOCIATION OF RISK PROFESSIONALS

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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 2008 FRM Practice Exams I, II and III have been developed to aid candidates in their preparation for the FRM Examination in November 2008. These practice exams are based on a sample of questions from the 2006 FRM Examination and are representative of the questions that will be in the 2008 FRM Examination. Wherever necessary and possible, questions, answers and references have been updated to better reflect the topics and core readings listed in the *2008 FRM Examination Study Guide*.

The 2008 FRM Practice Exam I, II and III each contain 40 multiple-choice questions. Note that the 2008 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 2008 FRM Practice Exams I, II and III do not necessarily cover all topics to be tested in the 2008 FRM Examination. For a complete list of topics and core readings, candidates should refer to the *2008 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:

1. 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.

2. 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.

3. 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 and 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.

2008 FRM® Practice EXAM 1

2008 FRM PRACTICE EXAM I: CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	○	○	○
2.	○	○	○	○
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22.	○	○	○	○

	a.	b.	c.	d.
23.	○	○	○	○
24.	○	○	○	○
25.	○	○	○	○
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29.	○	○	○	○
30.	○	○	○	○
31.	○	○	○	○
32.	○	○	○	○
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36.	○	○	○	○
37.	○	○	○	○
38.	○	○	○	○
39.	○	○	○	○
40.	○	○	○	○

Correct way to complete

1. ● ● ● ●

Wrong way to complete

1. ⊘ ⊖ ✓ ✘

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1. On a multiple choice exam with four choices for each of six questions, what is the probability that a student gets less than two questions correct simply by guessing?

a. 0.46%
b. 23.73%
c. 35.60%
d. 53.39%

2. A portfolio manager enters into a total rate of return swap as the total return receiver. Under which of the following situations would the portfolio manager be required to make a net outlay to the counterparty?

a. If the transaction was initiated as a hedge, then no outlay was required.
b. There was a capital gain on the reference asset.
c. The market value of the reference asset decreased significantly.
d. The spread between the reference asset and the benchmark asset changed.

3. Which type of distribution produces the lowest probability for a variable to exceed a specified extreme value 'X' which is greater than the mean assuming the distributions all have the same mean and variance?

a. A leptokurtic distribution with a kurtosis of 4.
b. A leptokurtic distribution with a kurtosis of 8.
c. A normal distribution.
d. A platykurtic distribution

4. Given two random variables X and Y, what is the Variance of X given Variance[Y] = 100, Variance [4X - 3Y] = 2,700 and the correlation between X and Y is 0.5?

a. 56.3
b. 113.3
c. 159.9
d. 225.0

5. Which of the following reduce a credit exposure by shortening the effective maturity of a position?

I. Liquidity put
II. Credit trigger

a. Both I and II
b. I but not II
c. II but not I
d. Neither of I or II

6. In a securitized transaction, over-collateralization results when

a. The originator puts aside some cash in a reserve account to absorb credit losses.
b. A securitization transaction carves up the cash flows generated from the asset pool into various pieces.
c. The interest payments and other fees received on the assets in the pool exceed the interest payment made on the ABS plus the fee paid to service the assets along with miscellaneous expenses.
d. The value of the assets in the pool exceeds the amount of Asset Backed Security (ABS) involved.

7. The payoff of some hedge fund strategies is commonly identified with the payoff of option strategies. The payoff of a long look-back straddle correspond best to the payoff of

a. A trend following strategy.
b. A fixed-income arbitrage strategy.
c. A fixed-income convergence strategy.
d. A spread trading strategy.

8. Suppose the rate on 1-year zero-coupon corporate bonds is 13.5% and the implied probability of default is 3.96%. Assume LGD is 100%. Based on the given information, the 1-year T-bill rate is closest to:

a. 4.49%
b. 9.00%
c. 6.74%
d. 6.00%

9. A portfolio manager wants to hedge his bond portfolio against changes in interest rates. He intends to buy a put option with a strike price below the portfolio's current price in order to protect against rising interest rates. He also wants to sell a call option with a strike price above the portfolio's current price in order to reduce the cost of buying the put option. What strategy is the manager using?

a. Bear spread
b. Strangle
c. Collar
d. Straddle

10. Paul Graham, FRM is analyzing the sales growth of a baby product launched three years ago by a regional company. He assesses that three factors contribute heavily towards the growth and comes up with the following results:

$Y = b + 1.5\ X_1 + 1.2X_2 + 3X_3$

Sum of Squared Regression [SSR] = 869.76
Sum of Squared Errors [SEE] = 22.12

Determine what proportion of sales growth is explained by the regression results.

a. 0.36
b. 0.98
c. 0.64
d. 0.55

11. Which of the following is **not** a limitation of using the Capital Asset Pricing Model to measure equity requirements for operational risk?

a. Measurement error in separately measuring levered and un-levered beta.
b. Time lags in variables like tax and regulation being reflected in historical beta estimates.
c. Requires detailed knowledge of profit and loss accounting to go from beta to a specific measure of operational risk.
d. All of the above.

12. Bank Omega's foreign currency trading desk is composed of 2 dealers; dealer A, who holds a long position of 10 million CHF against the USD, and dealer B, who holds a long position of 10 million SGD against the USD. The current spot rates for USD/CHF and USD/SGD are 1.2350 and 1.5905 respectively. Using the variance/covariance approach, you worked out the 1 day, 95% VAR of dealer A to be USD77,632 and that of dealer B to be USD27,911. If the correlation coefficient between the SGD and CHF is +0.602 and assuming that these are the only trading exposures for dealer A and dealer B, what would you report as the 1 day, 95% VAR of Bank Omega's foreign currency trading desk using the variance/covariance approach?

a. USD 97,027
b. USD 105,543
c. USD 113,932
d. Cannot be determined due to insufficient data

13. All else being equal, which of the following options would cost more than plain vanilla options?

I. lookback options
II. barrier options
III. Asian options
IV. chooser options

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

14. Under the Internal ratings-based approach of the Basel II accord for securitization exposures, an Asset-backed commercial paper's (ABCP), which of the following does 'Thickness of exposure' refer to?

a. The average 'number of years' the bank has been associated with the borrower as a lender.
b. It is the ratio of the 'nominal size of the tranche of interest' to 'the notional amount of exposures' in the pool.
c. It is the ratio of the 'amount of all securitization exposures subordinate to the tranche in question' to 'the amount of exposures in the pool'.
d. The average 'amount' of the exposure (international) to the group of borrowers in the pool converted to Euros.

15. Assuming other things constant, bonds of equal maturity will still have different DV01 per USD 100 Face Value. Their DV01 per USD 100 Face Value will be in the following sequence of Highest Value to Lowest Value:

a. Zero Coupon Bonds, Par Bonds, Premium Bonds
b. Premium Bonds, Par Bonds, Zero Coupon Bonds
c. Premium Bonds, Zero Coupon Bonds, Par Bonds,
d. Zero Coupon Bonds, Premium Bonds, Par Bonds

16. The risk-neutral default probability and the real-world (or physical) default probability are used in the analysis of credit risk. Which one of the following statements on their uses is correct?

a. Real-world default probability should be used in scenario analyses of potential future losses from defaults, and real-world default probability should also be used in valuing credit derivatives.
b. Real-world default probability should be used in scenario analyses of potential future losses from defaults, but risk-neutral default probability should be used in valuing credit derivatives.
c. Risk-neutral default probability should be used in scenario analyses of potential future losses from defaults, and risk-neutral default probability should also be used in valuing credit derivatives.
d. Risk-neutral default probability should be used in scenario analyses of potential future losses from defaults, but real-world default probability should also be used in valuing credit derivatives.

17. You are given the following information about a call option:

- Time to maturity = 2 years
- Continuous risk-free rate = 4%
- Continuous dividend yield = 1%
- $N(d_1) = 0.64$

Calculate the delta of this option.

a. -0.64
b. 0.36
c. 0.63
d. 0.64

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

a. American options can be exercised at any time until 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 valued with binomial trees

Questions 19 and 20 use the following information.

Consider a stock that pays no dividends, has a volatility of 25% per annum and an expected return of 13% per annum. Suppose that the current share price of the stock, S_0, is USD 30. You decide to model the stock price behavior using a discrete-time version of geometric Brownian motion and to simulate paths of the stock price using Monte Carlo simulation. Let Δt denote the time interval used and let St denote the stock price at time interval t. So, according to your model,

$$s_{t+1} = s_t (1 + 0.13\,\Delta t + 0.25\,\sqrt{\Delta t}\,\varepsilon)$$

where Δ is a standard normal variable.

19. To implement this simulation, you generate a path of the stock price by starting at t = 0, generating a sample for ε, updating the stock price according to the model, incrementing t by 1, and repeating this process until the end of the horizon is reached.

Which of the following strategies for generating a sample for Δ will implement this simulation properly?

a. Generate a sample for ε by using the inverse of the standard normal cumulative distribution of a sample value drawn from a uniform distribution between 0 and 1.
b. Generate a sample for ε by sampling from a normal distribution with mean 0.13 and standard deviation 0.25.
c. Generate a sample for ε by using the inverse of the standard normal cumulative distribution of a sample value drawn from a uniform distribution between 0 and 1. Use Cholesky decomposition to correlate this sample with the sample from the previous time interval.
d. Generate a sample for ε by sampling from a normal distribution with mean 0.13 and standard deviation 0.25. Use Cholesky decomposition to correlate this sample with the sample from the previous time interval.

20. You have implemented the simulation process discussed above using a time interval $\Delta_t = 0.001$, and you are analyzing the following stock price path generated by your implementation.

t	Stock price at start of period	Sample value for ε	Change in stock price during period
0	$30.00	0.3902	$0.10
1	$30.10	0.6597	$0.16
2	$30.26	0.6539	$0.16
3	$30.42	0.1065	$0.03
4	$30.45	0.0416	$0.01
5	$30.46	0.8603	$0.21
6	$30.67	0.3110	$0.08
7	$30.75	0.7786	$0.19
8	$30.95	0.6466	$0.16
9	$31.11	0.8188	$0.21
10	$31.31	0.1998	$0.05

t	Stock price at start of period	Sample value for ε	Change in stock price during period
11	$31.37	0.7499	$0.19
12	$31.56	0.2546	$0.07
13	$31.62	0.9347	$0.24
14	$31.86	0.3814	$0.10
15	$31.96	0.8101	$0.21
16	$32.17	0.8518	$0.22
17	$32.39	0.2478	$0.07
18	$32.46	0.7913	$0.21
19	$32.67	0.9147	$0.24
20	$32.91	0.5941	$0.16

Given this sample, which of the following simulation steps most likely contains an error?

a. Calculation to update the stock price.
b. Generation of random sample value for ε.
c. Calculation of the change in stock price during each period.
d. None of the above.

21. Under the comprehensive approach for foundation IRB, which of the following methods is used for calculating the effective loss given default (LGD*) where:

- LGD* is the effective loss given default(considering risk mitigation measures)
- LGD is that of the senior unsecured exposure before recognition of collateral (45%);
- E is the current value of the exposure (i.e. cash lent or securities lent or posted);
- E* is the exposure value after risk mitigation
- IRB-Internal Rating Based Approach

a. LGD* = LGD x (E* / E)
b. LGD* = LGD x (E*)*(E)
c. LGD* = LGD x (E* + E)
d. LGD* = LGD x (E* - E)

22. Suppose a 20-year annual coupon bond has a DV01 of 0.14865. Also suppose a 12-year annual coupon bond, which will be used as the hedging instrument, has a DV01 of 0.09764. If the yield beta is 1.10, which of the following statements accurately describes the situation?

a. The hedging instrument is significantly more volatile than the position in the 20-year bond, and the hedge ratio is 1.67467.
b. The position in the 20-year bond is significantly more volatile than the hedging instrument, and the hedge ratio is 0.72253.
c. In order to have a perfectly hedged position, for every USD 1 of the 20-year bond, USD 1.67467 of the 12-year bond should be shorted.
d. In order to have a perfectly hedged position, for every USD 1 of the 20-year bond, USD 0.72253 of the 12-year bond should be shorted.

23. Which of the following statements about the differences between market and operational value-at-risk at financial institutions are correct?

I. The distribution of operational risk events must include sufficient mass in the extreme tail, making an assumption of a lognormal distribution invalid.
II. The typical time horizon of market VaR calculations is 1 day, whereas the typical time horizon of operational VaR calculations is 1 year.
III. Since prices are sufficiently available for liquid assets at all times, the market risk of liquid assets can be modeled using continuous distributions, but the nature of operational risk events requires using discrete distributions.
IV. Market VaR requires a higher confidence level than operational VaR.

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

24. Which of the following is **not** a modeling approach to credit scoring?

a. k--nearest neighbor classifier models.
b. Logit and Probit models.
c. Fisher linear discriminant analysis.
d. Bayesian vector autoregression.

25. Suppose an existing short option position is delta-neutral, but has a gamma of negative 600. Also assume that there exists a traded option with a delta of 0.75 and a gamma of 1.50. In order to maintain the position gamma-neutral and delta-neutral, which of the following is the appropriate strategy?

a. Buy 400 options and sell 300 shares of the underlying asset.
b. Buy 300 options and sell 400 shares of the underlying asset.
c. Sell 400 options and buy 300 shares of the underlying asset.
d. Sell 300 options and buy 400 shares of the underlying asset.

26. Which of the following is **not** a true statement about internal credit ratings?

a. The "at-the-point-in-time" approach makes heavy use of econometric modeling that relates current financial variables to estimated default risk.
b. The "through-the-cycle" approach is forward-looking and attempts to incorporate future economic scenarios into current default risk estimates.
c. "At-the-point-in-time" credit scores volatility is much higher than "through-the-cycle" score volatility.
d. A sound internal system uses at-the-point-in-time scoring for small-to-medium-sized companies and private firms and through-the-cycle scoring for large firms.

27. Firm A has equity volatility of .3 and debt to firm value (debt to capitalization) of .4. Firm B has the same debt to firm value but its asset volatility is .3. Which statement about firms A and B is true?

a. The capital of Firm A is less than the leverage of Firm B.
b. The volatility of Firm A's operations is greater than the volatility of Firm B's operations.
c. The equity of Firm B is less risky than the equity of Firm A.
d. The equity of Firm A is less risky than the equity of Firm B.

28. One of the requirements while using IRB is full integration of the internal model into the overall management information systems of the institution and in the management of the banking book equity portfolio. Which of the following best describes this requirement?

a. Establishing investment hurdle rates and evaluating alternative investments.
b. Measuring and assessing equity portfolio performance (including the risk-adjusted performance).
c. Allocating economic capital to equity holdings and evaluating overall capital adequacy as required under Pillar 2.
d. All of the above.

29. Fund A which pursues energy trading derivatives strategies is considering merging with Fund B, an equity derivatives trading operation. One of the primary drivers behind the merger talks is the possibility of savings on the technology and operations staff supporting each firm's trading environment. Certain of the facts underlying the merger discussions are as follows:

	Yearly Operations Cost	Yearly Transaction Volume	Avg. Cost of Production
Fund A	2,000,000	4 Bln	.05%
Fund B	1,200,000	6 Bln	.02%

Assuming Fund A and Fund B decided to merge and determine that through the combination they can support their combined trading activities at a total cost of 2,500,000, what would be the average cost of technology and operations for the combined firm.

a. .52% due to diseconomies of scope
b. .25% due to economies of scale
c. .52% due to diseconomies of scale
d. .25% due to economies of scope

30. You are hired as the credit risk manager for a large bank. You find that the bank's credits are poorly diversified. The bank has an extremely large exposure to one firm with a BB rating. All its other loans have the equivalent of an AAA rating. You recommend that the bank diversify its credit exposures. After the bank follows your advice, you are summoned to the CEO's office and fired. The CEO says that they followed your advice, acquired many small exposures to firms with BB ratings to replace the large exposure, and all it did was to make the bank riskier because its credit VaR increased. The bank measures its credit VaR as the maximum loss of principal over one year at the 1% level. You seek advice from a consultant to make sure not to repeat the mistake you made. Which of the following explanations provided by the consultant is correct?

a. VaR necessarily falls as diversification increases. Consequently, the bank's software to compute VaR must be flawed.
b. The bank did not diversify since it replaced one exposure with a BB rating with multiple exposures with a BB rating.
c. The VaR would not have increased had the bank measured it as a shortfall relative to the expected value of the banking book.
d. The VaR would not have increased had the bank not used the normal distribution for the portfolio return.

31. Assume we estimate volatility and calculate a one day VaR. If volatility is mean reverting what can we say about the t day VaR?

a. It is less than the $\sqrt{t} *$ one day VaR
b. It is equal to $\sqrt{t} *$ one day VaR
c. It is greater than the $\sqrt{t} *$ one day VaR
d. It could be greater or less than the $\sqrt{t} *$ one day VaR

32. Your firm is holding a short position in an Argentinean bond with a notional value of ARS 5,000,000 and a coupon yield of 5.5%. Your model predicts the bond's yield will decrease over the coming year. You are asked to hedge the position. Your recommendation is to:

a. Buy a credit default swap
b. Sell a credit-spread put option
c. Short a credit-spread forward
d. Buy a total rate of return swap

33. Imagine a stack-and-roll hedge of monthly commodity deliveries that you continue for the next five years. Assume the hedge ratio is adjusted to take into effect the mistiming of cash flows but is not adjusted for the basis risk of the hedge. In which of the following situations is your calendar basis risk likely to be greatest?

a. Stack and roll in the front month in oil futures.
b. Stack and roll in the 12-month contract in natural gas futures.
c. Stack and roll in the 3-year contract in gold futures.
d. All four situations will have the same basis risk.

34. Which of the following statements correctly describes the properties of operational risk management tools?

a. Key risk indicators are subjective measures that allow the risk manager to forecast losses.
b. Causal networks utilize conditional probabilities.
c. Actuarial models require a top down methodology.
d. Earnings volatility models adjust automatically for macroeconomic risks.

35. An analyst has compiled the following information on a portfolio:

- Sortino Ratio: 0.82
- Beta: 1.15
- Expected return: 12.2%
- Standard deviation: 16.4%
- Benchmark return: 11.9%
- Risk-free rate: 4.75%

Calculate the semi-standard deviation of the portfolio?

a. 0.4%
b. 8.2%
c. 14.9%
d. 9.08%

36. Consider an asset worth USD 1 million whose 95th percentile VaR is USD 100,000 (computed using the parametric method assuming the normal distribution). Suppose the bid-ask spread on the asset has a mean of USD 0.10 and a standard deviation of USD 0.30. What is the 95th percentile liquidity adjusted VaR assuming the market risk VaR and the liquidity risk piece are uncorrelated?

a. USD 200,000
b. USD 344,000
c. USD 444,000
d. USD 688,000

37. Company XYZ's pension fund has liabilities of USD 100 million and assets of USD 120 million. The annual growth of the liabilities has an expected value of 5% with 3% volatility. The annual return of the assets has an expected value of 8% with 12% volatility. The correlation between asset return and liability growth is 0.3. What is the 95% surplus-at-risk?

a. USD 27.6 million
b. USD 22.7 million
c. USD 13.8 million
d. USD 18.1 million

38. Company EFG is a large derivative market-maker that has many contracts with counterparty JKL, some transacted in the same legal jurisdiction and others across different legal jurisdictions. As a result, EFG has some contracts with JKL covered under legally enforceable netting agreement A, some contracts with JKL covered under legally enforceable netting agreement B, and some contracts with JKL with no netting agreement. Ignoring the effect of margin, if the current value (i.e., market value of the contract minus collateral and recovery value) and the netting agreement status of each contract with JKL are as shown below, what is EFG's current counterparty credit exposure to JKL?

Contract	Netting Agreement Status	Current Value
1	Covered by Netting Agreement A	USD 2,105
2	Covered by Netting Agreement A	(-USD 3,319)
3	Covered by Netting Agreement A	USD 1,977
4	Covered by Netting Agreement B	USD 5,876
5	Covered by Netting Agreement B	(-USD 633)
6	Covered by Netting Agreement B	(-USD 2,335)
7	Covered by Netting Agreement B	USD 4,006
8	Not Covered by any Netting Agreement	USD 2,439
9	Not Covered by any Netting Agreement	(-USD 1,504)

a. USD 8,612
b. USD 6,914
c. USD 14,899
d. USD 2,341

39. Large banks typically allocate risk capital for credit, operational and market/ALM risks. Which of the following statements ranks the typical amount of risk capital allocated to these different risks correctly starting with the largest amount?

a. Market/ALM risk requires more risk capital than credit risk.
b. Credit risk requires more risk capital than market/ALM risk which requires more risk capital than operational risk.
c. Market/ALM risk requires more risk capital than operational risk but less than credit risk.
d. Credit risk requires more risk capital than operational risk which requires more risk capital than market/ALM.

40. The DataSoft Corporation has an employee pension scheme with fixed liabilities and a long time horizon reflecting its young workforce. The fund's assets are USD 9 billion and the present value of its liabilities is USD 8.8 billion.

Which of the following statements is/are incorrect?

I. The present value of long-term fixed payments behaves very much like a long position in a fixed rate bond.
II. Surplus at Risk is a measure of relative risk.
III. The DataSoft Corporation will be able to immunize its liabilities by investing USD 8 billion in long-term fixed rate bonds.

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

2008 FRM PRACTICE EXAM I: CORRECT CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	○	○	●
2.	○	○	●	○
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30.	○	○	●	○
31.	○	○	○	●
32.	○	●	○	○
33.	●	○	○	○
34.	○	●	○	○
35.	○	○	○	●
36.	○	○	●	○
37.	○	○	○	●
38.	○	○	○	●
39.	○	○	○	●
40.	○	○	●	○

Correct way to complete
1. ● ● ● ●

Wrong way to complete
1. ⊘ ⊖ ✓ ✘

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2008 FRM PRACTICE EXAM I: ANSWERS AND EXPLANATIONS

1. On a multiple choice exam with four choices for each of six questions, what is the probability that a student gets less than two questions correct simply by guessing?

a. 0.46%
b. 23.73%
c. 35.60%
d. 53.39%

Answer: d

a. Incorrect. This answer incorrectly sets the probability of success equal to (3/4), not (1/4). This answer is the probability that the student answers more than four questions correctly.
b. Incorrect. This answer incorrectly omits that there are 6 different ways to get only one answer correct.
c. Incorrect. This answer is the probability that exactly one question is answered correctly. The question asks for the probability that less than two questions are answered correctly.
d. Correct. The number of questions correct follows a binomial distribution where the probability of success is (1/4) and the number of trials is 6. Therefore, the probability of getting zero correct, p(0), and the probability of getting one correct, p(1), are:

p(0) = (3/4)^6 = 0.17798
p(1) = 6 * (1/4) * (3/4)^5 = 0.35596

And so, the probability of getting less than two questions correct is p(0) + p(1) = 53.39%.

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 4 – Special Probability Distributions

2. A portfolio manager enters into a total rate of return swap as the total return receiver. Under which of the following situations would the portfolio manager be required to make a net outlay to the counterparty?

a. If the transaction was initiated as a hedge, then no outlay was required.
b. There was a capital gain on the reference asset.
c. The market value of the reference asset decreased significantly.
d. The spread between the reference asset and the benchmark asset changed.

Answer: c

a. Incorrect. The hedge may not perform as expected. For example, the credit spread may narrow but if the yields are rising, then the total return receiver may still be required to make a net payment.
b. Incorrect. A capital gain means that the total return receiver will receive a payment.
c. Correct. When the market value of the reference asset decreased, that means a capital loss, hence the total return receiver will be required to pay the net difference. In other words, the total return receiver is exposed to both credit risk and market risk.
d. Incorrect. There is a reference asset in the total rate of return swap, but not an additional benchmark asset.

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 2 – Credit Derivatives Products

3. Which type of distribution produces the lowest probability for a variable to exceed a specified extreme value 'X' which is greater than the mean assuming the distributions all have the same mean and variance?

a. A leptokurtic distribution with a kurtosis of 4.
b. A leptokurtic distribution with a kurtosis of 8.
c. A normal distribution.
d. A platykurtic distribution.

Answer: d

a. Incorrect. A leptokurtic distribution has fatter tails than the normal distribution. The kurtosis indicates the level of fatness in the tails, the higher the kurtosis, the fatter the tails. Therefore, the probability of exceeding a specified extreme value will be higher.
b. Incorrect. Since answer A. has a lower kurtosis, a distribution with a kurtosis of 8 will necessarily produce a larger probability in the tails.
c. Incorrect. By definition, a normal distribution has thinner tails than a leptokurtic distribution and larger tails than a platykurtic distribution.
d. Correct. By definition, a platykurtic distribution has thinner tails than both the normal distribution and any leptokurtic distribution. Therefore, for an extreme value X, the lowest probability of exceeding it will be found in the distribution with the thinner tails.

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 3 – Mathematical Expectation

4. Given two random variables X and Y, what is the Variance of X given Variance[Y] = 100, Variance [4X - 3Y] = 2,700 and the correlation between X and Y is 0.5?

a. 56.3
b. 113.3
c. 159.9
d. 225.0

Answer: d

a. Incorrect. +3 was used instead of -3 when solving. Variance [4X - 3Y] = 16*Var[X] + 9*Var[Y] + 2*4*(+3)*Var[X]^(1/2)* Var[Y]^(1/2)*correlation[X,Y]. Solve for Var[X] = 56.3.
b. Incorrect. (Var[X]^(1/2)* Var[Y]^(1/2) is missing from the equation when solving. Variance [4X - 3Y] = 16*Var[X] + 9*Var[Y] + 2*4*(-3)*correlation[X,Y]. Solve for Var[X] = 113.3.
c. Incorrect. The factor of 2 is missing from the equation. Variance [4X-3Y] = 16*Var[X] + 9*Var[Y] + 2*4*(-3)*Var[X]^(1/2)* Var[Y]^(1/2)*correlation[X,Y]. Solve for Var[X] = 159.9.
d. Correct. Using the theorems on variance and covariance, Variance [4X-3Y] = 16*Var[X] + 9*Var[Y] + 2*4*(-3)*Var[X]^(1/2)* Var[Y]^(1/2)*correlation[X,Y]. Solve for Var[X] = 225.0.

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 3 – Mathematical Expectation

5. Which of the following reduce a credit exposure by shortening the effective maturity of a position?

I. Liquidity put
II. Credit trigger

a. Both I and II
b. I but not II
c. II but not I
d. Neither of I or II

Answer: a

Liquidity puts give the parties the right to settle and terminate trades on pre-specified future dates. Credit triggers specify that trades must be settled if the credit rating of a party falls below pre-specified levels. Hence the correct combination is both of the above i.e. option A.

Reference:
Leo Tillman (ed.), ALM of Financial Institutions,(London: Euromoney Institutional Investor, 2003)., "Measuring and Marking Counterparty Risk" by Eduardo Canabarro and Darrell Duffie

6. In a securitized transaction, over-collateralization results when

a. The originator puts aside some cash in a reserve account to absorb credit losses.
b. A securitization transaction carves up the cash flows generated from the asset pool into various pieces.
c. The interest payments and other fees received on the assets in the pool exceed the interest payment made on the ABS plus the fee paid to service the assets along with miscellaneous expenses.
d. The value of the assets in the pool exceeds the amount of Asset Backed Security (ABS) involved.

Answer: d

a. Stands for cash reserve account
b. Definition for subordinated tranching
c. Mentions about excess spread
d. Is correct defines over collateralization

Reference:
Christopher L. Culp, Structured Finance and Insurance: The Art of Managing Capital and Risk (Hoboken: John Wiley & Sons, Inc., 2006)., Chapter 16 – Securitization

7. The payoff of some hedge fund strategies is commonly identified with the payoff of option strategies. The payoff of a long look-back straddle correspond best to the payoff of

a. A trend following strategy.
b. A fixed-income arbitrage strategy.
c. A fixed-income convergence strategy.
d. A spread trading strategy.

Answer: c

Reference:
William Fung and David Hsieh, "The Risk in Fixed-Income Hedge Fund Strategies", Journal of Fixed Income 12, 6-27 (2002)

8. Suppose the rate on 1-year zero-coupon corporate bonds is 13.5% and the implied probability of default is 3.96%. Assume LGD is 100%. Based on the given information, the 1-year T-bill rate is closest to:

a. 4.49%
b. 9.00%
c. 6.74%
d. 6.00%

Answer: b

a. Incorrect. See the correct calculation in B below.
b. Correct. Probability of Default = 1 – [(1 + 1-yr T-bill rate) / (1 + 1-yr corp. bond rate)]
0.396 = 1 – [(1 + 1-yr T-bill rate) / (1 + 0.135)]
Solving the above, 1-year T-bill rate = 9.005%.
c. Incorrect. See the correct calculation in B above.
d. Incorrect. See the correct calculation in B above.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 11 – Credit Risk: Individual Loan Risk

9. A portfolio manager wants to hedge his bond portfolio against changes in interest rates. He intends to buy a put option with a strike price below the portfolio's current price in order to protect against rising interest rates. He also wants to sell a call option with a strike price above the portfolio's current price in order to reduce the cost of buying the put option. What strategy is the manager using?

a. Bear spread
b. Strangle
c. Collar
d. Straddle

Answer: c

a. Incorrect. The description is not for bear spread. A bear spread is created by buying a nearby put and selling a more distant put. A bear spread can also be set up using calls.
b. Incorrect. The description is not for box spread. If the options are correctly priced, then the risk free rate will be earned for a box spread.
c. Correct. The description is for a collar strategy which limits changes in the portfolio value in either direction. In other words, a collar is defined around the current portfolio value.
d. Incorrect. The description is not for straddle. A straddle is created by buying a put and a call at the same strike price and expiration to take advantage of significant portfolio moves in either direction.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 10 – Trading Strategies Involving Options

10. Paul Graham, FRM® is analyzing the sales growth of a baby product launched three years ago by a regional company. He assesses that three factors contribute heavily towards the growth and comes up with the following results:

$Y = b + 1.5\ X_1 + 1.2X_2 + 3X_3$

Sum of Squared Regression [SSR] = 869.76
Sum of Squared Errors [SEE] = 22.12

Determine what proportion of sales growth is explained by the regression results.

a. 0.36
b. 0.98
c. 0.64
d. 0.55

Answer: c

a. Incorrect. Coefficient of Determination i.e. R^2 explains proportion of variation explained by the regression. $R^2 = SSR/SST$, $SEE = (SSE/(n-2))^{1/2}$, $SST = SSR + SSE$
b. Incorrect. The candidate will choose this if he/she confuses SEE with SSE in the calculation explained in choice 'c'.
c. Correct. Coefficient of Determination i.e. R^2 explains proportion of variation explained by the regression. $R^2 = SSR/SST$, $SEE = (SSE/(n-2))^{1/2}$, $SST = SSR + SSE$. Therefore, SSE = 489.29, SST = 1359.05, $R^2 = 0.64$
d. Incorrect. Coefficient of Determination i.e. R2 explains proportion of variation explained by the regression. $R^2 = SSR/SST$, $SEE = (SSE/(n-2))^{1/2}$, $SST = SSR + SSE$

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 8 – Curve Fitting, Regression, and Correlation

11. Which of the following is **not** a limitation of using the Capital Asset Pricing Model to measure equity requirements for operational risk?

a. Measurement error in separately measuring levered and un-levered beta.
b. Time lags in variables like tax and regulation being reflected in historical beta estimates.
c. Requires detailed knowledge of profit and loss accounting to go from beta to a specific measure of operational risk.
d. All of the above.

Answer: d

Explanation: This is not a good way to measure operational risk, and these are just three of the reasons why.

Reference:
Ellen Davis, ed, The Advanced Measurement Approach to Operational Risk, (London: Risk Books, 2006)., Chapter 4 – Operational Risk Economic Capital Measurement: Mathematical Models for Analysing Loss Data, by Gene Alvarez

12. Bank Omega's foreign currency trading desk is composed of 2 dealers; dealer A, who holds a long position of 10 million CHF against the USD, and dealer B, who holds a long position of 10 million SGD against the USD. The current spot rates for USD/CHF and USD/SGD are 1.2350 and 1.5905 respectively. Using the variance/covariance approach, you worked out the 1 day, 95% VAR of dealer A to be USD77,632 and that of dealer B to be USD27,911. If the correlation coefficient between the SGD and CHF is +0.602 and assuming that these are the only trading exposures for dealer A and dealer B, what would you report as the 1 day, 95% VAR of Bank Omega's foreign currency trading desk using the variance/covariance approach?

a. USD 97,027
b. USD 105,543
c. USD 113,932
d. Cannot be determined due to insufficient data

Answer: a

a. Note that the question asks for the VAR number to be expressed in USD. Therefore, the first step is to convert the foreign currency positions in terms of USD.
Dealer A's position in USD: 10,000,000/1.2350 = USD8,097,166
Dealer B's position in USD: 10,000,000/1.5905 = USD6,287,331
Given that the VAR of dealer A is USD77,632, we first work the daily volatility for the USD/CHF, denoted here by s_{CHF} By definition we get 8,097,166 x 1.645 x s_{CHF} = 77,632
Therefore, s_{CHF} = 77,632/(8,097,166 x 1.645) = 0.005828 or 0.5828%
Similarly, the daily volatility for the USD/SGD, denoted here by s_{SGD} is worked out as follows: s_{SGD} = 27,911/(6,287,331 x 1.645) = 0.002699 or 0.2699%. By definition, the standard deviation of the change in the portfolio which comprises of both the currency pairs over a 1-day period is given by: $[(0.005828 \times 8{,}097{,}166)^2 + (0.002699 \times 6{,}287{,}331)^2 + 2 \times 0.602 \times (0.005828 \times 8{,}097{,}166) \times (0.002699 \times 6{,}287{,}331)]^{0.5} = [(46{,}963.56)^2 + (16{,}975)^2 + 959{,}881{,}479.22]^{0.5} = [3{,}453{,}608{,}072.09]^{0.5} = 58{,}983$. Therefore, The 1-day, 95% VAR is 1.645 x 58,983 = USD97,027
b. Incorrect. This would overstate the VAR. Summing up the VARs would be correct only if the correlation coefficient is 1. Here the correlation coefficient is 0.602
c. Incorrect. By inspection, this can be eliminated straight away as the VAR of the combined positions cannot exceed the sum of the VAR of the individual positions.
d. Incorrect. Given the VARs of the individual positions, one can obtain the daily volatilities of the USD/CHF and the USD/SGD. The correlation of the SGD and CHF is also given. Therefore, there is sufficient data to work out the standard deviation of the change of the combined positions and hence arrive at VAR.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 10 – Market Risk

Note: the volatilities and correlation coefficients for this question are actual numbers as at June 22, 2006, extracted from Bloomberg's database.

13. All else being equal, which of the following options would cost more than plain vanilla options?

I. Lookback options
II. Barrier options
III. Asian options
IV. Chooser options

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

Answer: b

I. Correct. The payoff on look-back options depends on the maximum or minimum underlying price achieved during the life of the option. The option holder is guaranteed the most favorable rate during the life of the option. As a result, the premium is substantially higher than plain vanilla options.
II. Incorrect. A barrier option is extinguished or created only when the barrier is touched. For example, an up-and-in call option would only be created if at some point during the option's life the price of the underlying exceeded the barrier, if it failed to do so it could not be exercised regardless of whether it finished in-the-money or not. Similarly, a down-and-out put option would automatically be extinguished if, during the option's, life the underlying asset's price fell below the barrier. Barrier options are always less expensive than plain vanilla options as there is always a probability that the options will be knocked out or not be knocked in.
III. Incorrect. The pay-off for Asian options is based on the average price of the underlying asset over the life of the option and not a set strike price. Asian options are cheaper than plain vanilla options as average prices are less volatile than day-to-day prices.
IV. Correct. A chooser option has the feature that after a specified period of time, the holder can choose to decide whether the option is a put or call. As a result of this increased flexibility, chooser options are more expensive than plain vanilla options.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 22 – Exotic Options

14. Under the Internal ratings-based approach of the Basel II accord for securitization exposures, an Asset-backed commercial paper's (ABCP), which of the following does 'Thickness of exposure' refer to?

a. The average 'number of years' the bank has been associated with the borrower as a lender.
b. It is the ratio of the 'nominal size of the tranche of interest' to 'the notional amount of exposures' in the pool.
c. It is the ratio of the 'amount of all securitization exposures subordinate to the tranche in question' to 'the amount of exposures in the pool'.
d. The average 'amount' of the exposure (international) to the group of borrowers in the pool converted to Euros.

Answer: b

a. Incorrect. It is not the correct definition, as per Basel II accord.
b. Correct. It is the correct definition, as per Basel II accord.
c. Incorrect. It is not the correct definition, as per Basel II accord.
d. Incorrect. It is not the correct definition, as per Basel II accord.

Reference:
Basel Committee on Banking Supervision. "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for International Settlements, November 2005,

15. Assuming other things constant, bonds of equal maturity will still have different DV01 per USD 100 Face Value. Their DV01 per USD 100 Face Value will be in the following sequence of Highest Value to Lowest Value:

a. Zero Coupon Bonds, Par Bonds, Premium Bonds
b. Premium Bonds, Par Bonds, Zero Coupon Bonds
c. Premium Bonds, Zero Coupon Bonds, Par Bonds
d. Zero Coupon Bonds, Premium Bonds, Par Bonds

Answer: b

a. Incorrect. Premium Bond will have a higher Base Price and hence higher DV01 than that of Zero Coupon Bond.
b. Correct. DV01 is certain multiple of Dirty Price (which includes Coupons) and not Clean Price. Thus, it is proportional to Base Price, which is Dirty Price. Ordinarily, Premium Bond will have the highest (dirty) price followed by Par Bond and with the least price of Zero Coupon Bond. Hence, DV01 of Premium Bond is the highest while that of Zero Coupon Bonds is the lowest.
c. Incorrect. Base Price of Par Bond is higher than that of Zero Coupon Bond and hence, its DV01 cannot be less than that of Zero Coupon Bond.
d. Incorrect. DV01 per USD 100 Face Value is an Absolute Amount of USD based on actual Base Price Change. Ordinarily, Base Price of a Zero Coupon Bond will be lower than that of Par & Premium Bond. Hence, DV01 of Zero Coupon Bond is less than that of Premium Bond of same maturity.

Reference:
Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002)., Chapter 5 – One-Factor Measures of Price Sensitivity

16. The risk-neutral default probability and the real-world (or physical) default probability are used in the analysis of credit risk. Which one of the following statements on their uses is correct?

a. Real-world default probability should be used in scenario analyses of potential future losses from defaults, and real-world default probability should also be used in valuing credit derivatives.
b. Real-world default probability should be used in scenario analyses of potential future losses from defaults, but risk-neutral default probability should be used in valuing credit derivatives.
c. Risk-neutral default probability should be used in scenario analyses of potential future losses from defaults, and risk-neutral default probability should also be used in valuing credit derivatives.
d. Risk-neutral default probability should be used in scenario analyses of potential future losses from defaults, but real-world default probability should also be used in valuing credit derivatives.

Answer: b

a. Incorrect. Risk-neutral default probability should be used in valuing credit derivatives.
b. Correct. Real-world default probability should be used in scenario analyses of potential future losses from defaults, but risk-neutral default probability should be used in valuing credit derivatives.
c. Incorrect. Real-world default probability should be used in scenario analyses of potential future losses from defaults
d. Incorrect. Real-world default probability should be used in scenario analyses of potential future losses from defaults

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 3 – Synthetic Structures

17. You are given the following information about a call option:

- Time to maturity = 2 years
- Continuous risk-free rate = 4%
- Continuous dividend yield = 1%
- $N(d_1) = 0.64$

Calculate the delta of this option.

a. -0.64
b. 0.36
c. 0.63
d. 0.64

Answer: c

The delta of a call option with a continuous dividend yield is given by the following formula: Delta= $N(d_1)*e^{-qT}$, where q is the continuous dividend yield, and T is the time to maturity.
So, Delta = $0.64*e^{-0.01*2} = 0.63$.

a. Incorrect. The delta of a call is not equal to $-N(d_1)$.
b. Incorrect. The delta of a call is not equal to $1-N(d_1)$.
c. Correct. The above formula was used correctly, $N(d_1)*e-qT$.
d. Incorrect. The delta of a call with dividend yield is not equal to $N(d_1)$, the q was not used in the above formula.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 15 – The Greek Letters

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

a. American options can be exercised at any time until 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 valued with binomial trees

Answer: c

It is hard to value American options with Monte Carlo simulation, because it uses a prospective approach rather than a retrospective one.

a. Correct. American options can be exercise at any time.
b. Correct. American options can be exercise at any time vs. only at maturity for European option, which make American option more valuable.
c. Incorrect. It is very difficult to apply Monte Carlo retrospectively.
d. Correct. We can value American options at each node of the binomial tree as if it could be different exercise dates.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 9 – Properties of Stock Options

Questions 19 and 20 use the following information.

Consider a stock that pays no dividends, has a volatility of 25% per annum and an expected return of 13% per annum. Suppose that the current share price of the stock, S_0, is USD 30. You decide to model the stock price behavior using a discrete-time version of geometric Brownian motion and to simulate paths of the stock price using Monte Carlo simulation. Let Δt denote the time interval used and let S_t denote the stock price at time interval t. So, according to your model,

$$s_{t+1} = s_t (1 + 0.13\,\Delta t + 0.25\,\sqrt{\Delta t}\,\varepsilon)$$

where Δ is a standard normal variable.

19. To implement this simulation, you generate a path of the stock price by starting at t = 0, generating a sample for ε, updating the stock price according to the model, incrementing t by 1, and repeating this process until the end of the horizon is reached.

Which of the following strategies for generating a sample for Δ will implement this simulation properly?

a. Generate a sample for ε by using the inverse of the standard normal cumulative distribution of a sample value drawn from a uniform distribution between 0 and 1.
b. Generate a sample for ε by sampling from a normal distribution with mean 0.13 and standard deviation 0.25.
c. Generate a sample for ε by using the inverse of the standard normal cumulative distribution of a sample value drawn from a uniform distribution between 0 and 1. Use Cholesky decomposition to correlate this sample with the sample from the previous time interval.
d. Generate a sample for ε by sampling from a normal distribution with mean 0.13 and standard deviation 0.25. Use Cholesky decomposition to correlate this sample with the sample from the previous time interval.

Answer: a

Explanation: Monte Carlo Simulation assumes independence across time so there is no need to correlate samples from time period to time period, eliminating c and d. Choice a describes a valid method for generating a sample from a standard normal distribution.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 9 – Forecasting risk and correlations

John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 19 – Estimating volatilities and correlations

20. You have implemented the simulation process discussed above using a time interval $\Delta t = 0.001$, and you are analyzing the following stock price path generated by your implementation.

t	Stock price at start of period	Sample value for ε	Change in stock price during period
0	$30.00	0.3902	$0.10
1	$30.10	0.6597	$0.16
2	$30.26	0.6539	$0.16
3	$30.42	0.1065	$0.03
4	$30.45	0.0416	$0.01
5	$30.46	0.8603	$0.21
6	$30.67	0.3110	$0.08
7	$30.75	0.7786	$0.19
8	$30.95	0.6466	$0.16
9	$31.11	0.8188	$0.21
10	$31.31	0.1998	$0.05

t	Stock price at start of period	Sample value for ε	Change in stock price during period
11	$31.37	0.7499	$0.19
12	$31.56	0.2546	$0.07
13	$31.62	0.9347	$0.24
14	$31.86	0.3814	$0.10
15	$31.96	0.8101	$0.21
16	$32.17	0.8518	$0.22
17	$32.39	0.2478	$0.07
18	$32.46	0.7913	$0.21
19	$32.67	0.9147	$0.24
20	$32.91	0.5941	$0.16

Given this sample, which of the following simulation steps most likely contains an error?

a. Calculation to update the stock price.
b. Generation of random sample value for ε.
c. Calculation of the change in stock price during each period.
d. None of the above.

Answer: b

Explanation: The validity of the calculation to update the stock price is easily verified, as is the validity of the calculation of the change in the stock price during each period. The fact that after 20 time periods, the sample value of e has never been negative is very suspicious and likely contains an error.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 9 – Forecasting risk and correlations

John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 19 – Estimating volatilities and correlations

21. Under the comprehensive approach for foundation IRB, which of the following methods is used for calculating the effective loss given default (LGD*) where:

- LGD* is the effective loss given default(considering risk mitigation measures)
- LGD is that of the senior unsecured exposure before recognition of collateral (45%);
- E is the current value of the exposure (i.e. cash lent or securities lent or posted);
- E* is the exposure value after risk mitigation
- IRB-Internal Rating Based Approach

a. LGD* = LGD x (E* / E)
b. LGD* = LGD x (E*)*(E)
c. LGD* = LGD x (E* + E)
d. LGD* = LGD x (E* - E)

Answer: a

a. Correct as the formula for LGD* is correct.
b. Incorrect as the formula for LGD* is incorrect.
c. Incorrect as the formula for LGD* is incorrect.
d. Incorrect as the formula for LGD* is incorrect.

Reference:
Basel Committee on Banking Supervision Publication, November 2006, Studies on credit risk concentration: an overview of the issues and a synopsis of the results from the Research Task Force project

22. Suppose a 20-year annual coupon bond has a DV01 of 0.14865. Also suppose a 12-year annual coupon bond, which will be used as the hedging instrument, has a DV01 of 0.09764. If the yield beta is 1.10, which of the following statements accurately describes the situation?

a. The hedging instrument is significantly more volatile than the position in the 20-year bond, and the hedge ratio is 1.67467.
b. The position in the 20-year bond is significantly more volatile than the hedging instrument, and the hedge ratio is 0.72253.
c. In order to have a perfectly hedged position, for every USD 1 of the 20-year bond, USD 1.67467 of the 12-year bond should be shorted.
d. In order to have a perfectly hedged position, for every USD 1 of the 20-year bond, USD 0.72253 of the 12-year bond should be shorted.

Answer: c

a. Incorrect. While the calculated hedge ratio is correct, its interpretation is incorrect.
b. Incorrect. Hedge ratio has been incorrectly calculated with the DV01 of hedging instrument in the numerator and DV01 of the position in the denominator (whereas it should be the other way).
c. Correct. Hedge Ratio = (0.14865 x 1.10) / 0.09764 = 1.674672. Interpretation in answer 'C' is accurate for hedge ratio.
d. Incorrect. Because the calculated hedge ratio is incorrect.

Reference:
Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002)., Chapter 5 – One-Factor Measures of Price Sensitivity

23. Which of the following statements about the differences between market and operational value-at-risk at financial institutions are correct?

I. The distribution of operational risk events must include sufficient mass in the extreme tail, making an assumption of a lognormal distribution invalid.
II. The typical time horizon of market VaR calculations is 1 day, whereas the typical time horizon of operational VaR calculations is 1 year.
III. Since prices are sufficiently available for liquid assets at all times, the market risk of liquid assets can be modeled using continuous distributions, but the nature of operational risk events requires using discrete distributions.
IV. Market VaR requires a higher confidence level than operational VaR.

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

Answer: a

I. Correct. Low-Frequency, High Severity operational loss events imply that the distribution of operational loss events has sufficient mass in the extreme tail, so use of a lognormal distribution would be invalid.
II. Correct. The typical time horizon of market VaR calculations is 1 day, whereas the typical time horizon of operational VaR calculations is 1 year.
III. Correct. Since prices are sufficiently available for liquid assets at all times, the market risk of liquid assets can be modeled using continuous distributions, but the nature of operational risk events requires using discrete distributions.
IV. Incorrect. The confidence level for any VaR is a parameter set by the user.

Reference:
Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 5 – Extending the VaR Approach to Operational Risk

24. Which of the following is not a modeling approach to credit scoring?

a. k-nearest neighbor classifier models.
b. Logit and Probit models.
c. Fisher linear discriminant analysis.
d. Bayesian vector autoregression.

Answer: d

Explanation: BVAR is a time series tool used to analyze market shocks. It has limited cross-sectional applicability and is not a commonly used credit scoring modeling approach.

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 3 – Default Risk: Quantitative Methodologies

25. Suppose an existing short option position is delta-neutral, but has a gamma of negative 600. Also assume that there exists a traded option with a delta of 0.75 and a gamma of 1.50. In order to maintain the position gamma-neutral and delta-neutral, which of the following is the appropriate strategy?

a. Buy 400 options and sell 300 shares of the underlying asset.
b. Buy 300 options and sell 400 shares of the underlying asset.
c. Sell 400 options and buy 300 shares of the underlying asset.
d. Sell 300 options and buy 400 shares of the underlying asset.

Answer: a

a. Correct. To gamma-hedge, we should buy 400 options (600/1.50). The additional options will alter delta-hedge, and to maintain delta-hedge position again, we should sell 300 shares (400 x 0.75) of the underlying position.
b. Incorrect. This strategy will neither delta-hedge nor gamma-hedge the position.
c. Incorrect. This strategy will gamma-hedge, but not delta-hedge the position.
d. Incorrect. This strategy will neither delta-hedge nor gamma-hedge the position.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 15 – The Greek Letters

26. Which of the following is not a true statement about internal credit ratings?

a. The "at-the-point-in-time" approach makes heavy use of econometric modeling that relates current financial variables to estimated default risk.
b. The "through-the-cycle" approach is forward-looking and attempts to incorporate future economic scenarios into current default risk estimates.
c. "At-the-point-in-time" credit scores volatility is much higher than "through-the-cycle" score volatility.
d. A sound internal system uses at-the-point-in-time scoring for small-to-medium-sized companies and private firms and through-the-cycle scoring for large firms.

Answer: d

Explanation: The approaches are not compatible or directly comparable, and using the two approaches for different firms can yield highly inconsistent and misleading results.

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 2 – External and Internal Ratings

27. Firm A has equity volatility of .3 and debt to firm value (debt to capitalization) of .4. Firm B has the same debt to firm value but its asset volatility is .3. Which statement about firms A and B is true?

a. The capital of Firm A is less than the leverage of Firm B.
b. The volatility of Firm A's operations is greater than the volatility of Firm B's operations.
c. The equity of Firm B is less risky than the equity of Firm A.
d. The equity of Firm A is less risky than the equity of Firm B.

Answer: d

a. Incorrect. The two firms have the same capital ratio, so they have the same capital if they have the same assets. As no mention was made of asset size, it could go either way.
a. Incorrect. Firm A actually has the lower asset volatility and the opposite of the sentence is true.
a. Incorrect. We know that asset volatility is smaller than equity volatility holding constant leverage, so A has the lower asset volatility. This answer implies its asset volatility is higher.
a. Correct. See c for the explanation.

Reference:
René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 18 – Credit Risks and Credit Derivatives

28. One of the requirements while using IRB is full integration of the internal model into the overall management information systems of the institution and in the management of the banking book equity portfolio. Which of the following best describes this requirement?

a. Establishing investment hurdle rates and evaluating alternative investments.
b. Measuring and assessing equity portfolio performance (including the risk-adjusted performance).
c. Allocating economic capital to equity holdings and evaluating overall capital adequacy as required under Pillar 2.
d. All of the above.

Answer: d

a. Incorrect. As 'd' is the best choice.
b. Incorrect. As 'd' is the best choice.
c. Incorrect. As 'd' is the best choice.
d. Correct. As it is correct and the best choice as per Basel II.

Reference:
Basel Committee on Banking Supervision. "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for international Settlements, November 2005, para 528.

29. Fund A which pursues energy trading derivatives strategies is considering merging with Fund B, an equity derivatives trading operation. One of the primary drivers behind the merger talks is the possibility of savings on the technology and operations staff supporting each firm's trading environment. Certain of the facts underlying the merger discussions are as follows:

	Yearly Operations Cost	Yearly Transaction Volume	Avg. Cost of Production
Fund A	2,000,000	4 Bln	.05%
Fund B	1,200,000	6 Bln	.02%

Assuming Fund A and Fund B decided to merge and determine that through the combination they can support their combined trading activities at a total cost of 2,500,000, what would be the average cost of technology and operations for the combined firm.

a. .52% due to diseconomies of scope
b. .25% due to economies of scale
c. .52% due to diseconomies of scale
d. .25% due to economies of scope

Answer: d

The answer is calculated as follows:
€2,500,000
AC = €10,000,000,000 = .25%

Economies of scope relates to cost savings generated by jointly using inputs for multiple products resulting in a savings. Economies of scale relates to the output of a single financial institution as it output increases its average cost of production falls.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 14 – Technology and Other Operational Risks

30. You are hired as the credit risk manager for a large bank. You find that the bank's credits are poorly diversified. The bank has an extremely large exposure to one firm with a BB rating. All its other loans have the equivalent of an AAA rating. You recommend that the bank diversify its credit exposures. After the bank follows your advice, you are summoned to the CEO's office and fired. The CEO says that they followed your advice, acquired many small exposures to firms with BB ratings to replace the large exposure, and all it did was to make the bank riskier because its credit VaR increased. The bank measures its credit VaR as the maximum loss of principal over one year at the 1% level. You seek advice from a consultant to make sure not to repeat the mistake you made. Which of the following explanations provided by the consultant is correct?

a. VaR necessarily falls as diversification increases. Consequently, the bank's software to compute VaR must be flawed.
b. The bank did not diversify since it replaced one exposure with a BB rating with multiple exposures with a BB rating.
c. The VaR would not have increased had the bank measured it as a shortfall relative to the expected value of the banking book.
d. The VaR would not have increased had the bank not used the normal distribution for the portfolio return.

Answer: c

Explanation: By diversifying, the bank swaps the small probability of a large loss for the certainty of a small loss. Yet, the expected value of the banking book is unchanged and the volatility of the terminal value of the banking book has fallen.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 7 – Portfolio Risk: Analytical Methods

31. Assume we estimate volatility and calculate a one day VaR. If volatility is mean reverting what can we say about the t day VaR?

a. It is less than the $\sqrt{t}$ * one day VaR
b. It is equal to $\sqrt{t}$ * one day VaR
c. It is greater than the $\sqrt{t}$ * one day VaR
d. It could be greater or less than the $\sqrt{t}$ * one day VaR

Answer: d

Mean reverting volatility implies that there is an expected change in volatility over the time horizon. A simple mean reversion equation would be:

$Ds = k*(m - s) + e$

Where k is the speed of mean reversion, s is the volatility, and μ is the mean volatility.
The key here is to note that if volatility is greater then the mean then we expect tomorrow's volatility to be less than today's. If however volatility is less then the mean then we expect tomorrow's volatility to be greater than today's. Therefore, 'a', 'b' and 'c' are incorrect answers.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 9 – Forecasting risk and correlations

John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 19 – Estimating volatilities and correlations

32. Your firm is holding a short position in an Argentinean bond with a notional value of ARS 5,000,000 and a coupon yield of 5.5%. Your model predicts the bond's yield will decrease over the coming year. You are asked to hedge the position. Your recommendation is to:

a. Buy a credit default swap
b. Sell a credit-spread put option
c. Short a credit-spread forward
d. Buy a total rate of return swap

Answer: b

a. Incorrect. CDS is insurance against default of the underlying asset, here it is explicitly noted that the probably of default is expected to reduce over the coming year.
b. Correct. You are looking to hedge against a price increase in the underlying as you're currently short the bond.
c. Incorrect. You are not sure the underlying will decrease in value and the bond price decreases you will not be able to participate in the revalue as you have paid for the forward up front and if traded at mid market requires no premium.
d. Incorrect. Total rate of return swaps create non-funded positions in the total return of the referenced bond, effectively a default swap plus market risk. We are not concerned about credit risk or default, we're concerned about the underlying bond's asset value (credit quality) and hedging against that possibility.

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 2 – Credit Derivatives Products

33. Imagine a stack-and-roll hedge of monthly commodity deliveries that you continue for the next five years. Assume the hedge ratio is adjusted to take into effect the mistiming of cash flows but is not adjusted for the basis risk of the hedge. In which of the following situations is your calendar basis risk likely to be greatest?

a. Stack and roll in the front month in oil futures.
b. Stack and roll in the 12-month contract in natural gas futures.
c. Stack and roll in the 3-year contract in gold futures.
d. All four situations will have the same basis risk.

Answer: a

Explanation: The oil term structure is highly volatile at the short end, making a front-month stack-and-roll hedge heavily exposed to basis fluctuations. In natural gas, much of the movement occurs at the front end, as well, so the 12-month contract won't move as much. In gold, the term structure rarely moves much at all and won't begin to compare with oil and gas.

Reference:
Robert L. McDonald, Derivatives Markets, (Boston: Addison-Wesley, 2003)., Chapter 6 – Commodity Forwards and Futures

34. Which of the following statements correctly describes the properties of operational risk management tools?

a. Key risk indicators are subjective measures that allow the risk manager to forecast losses.
b. Causal networks utilize conditional probabilities.
c. Actuarial models require a top down methodology.
d. Earnings volatility models adjust automatically for macroeconomic risks.

Answer: b

a. Incorrect. Key risk indicators are objective not subjective measures.
b. Correct. Causal networks do utilize conditional probabilities.
c. Incorrect. Actuarial models require either a top down or a bottom up methodology.
d. Incorrect. Earnings volatility models do not adjust automatically for macro economic risks.

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

35. An analyst has compiled the following information on a portfolio:

- Sortino Ratio: 0.82
- Beta: 1.15
- Expected return: 12.2%
- Standard deviation: 16.4%
- Benchmark return: 11.9%
- Risk-free rate: 4.75%

Calculate the semi-standard deviation of the portfolio?

a. 0.4%
b. 8.2%
c. 14.9%
d. 9.08%

Answer: d

a. Incorrect. See below
b. Incorrect. See below
c. Incorrect. See below
d. Correct. See below

This question is really a test as to whether the candidate knows the components of the Sortino ratio.

$$\text{The Sortino Ratio} = \frac{\text{Average Portfolio Return} - \text{Risk-free Rate}}{\text{Semi-standard Deviation (SSD)}}$$

$0.82 = 12.2 - 4.75 = 12.2 - 4.75/0.82 = 9.08\%$
SSD

Reference:
Noel Amenc and Veronique Le Sourd, Portfolio Theory and Performance Analysis (West Sussex: Wiley, 2003)., Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

36. Consider an asset worth USD 1 million whose 95th percentile VaR is USD 100,000 (computed using the parametric method assuming the normal distribution). Suppose the bid-ask spread on the asset has a mean of USD 0.10 and a standard deviation of USD 0.30. What is the 95th percentile liquidity adjusted VaR assuming the market risk VaR and the liquidity risk piece are uncorrelated?

a. USD 200,000
b. USD 344,000
c. USD 444,000
d. USD 688,000

Answer: c

Explanation: If the VaR is USD100,000, the liquidity piece can be estimated from the mean and std dev of the spread as

$$V\frac{1}{2}(\mu - 1.96\sigma) = \text{USD}1{,}000{,}000\,\frac{1}{2}(\text{USD}0.10 - (1.96)(\text{USD}0.30)) = \text{USD}344{,}000$$

With no correlation to the market risk piece, we add to get (b).

Reference:
Christopher L. Culp, he Risk Management Process: Business Strategy and Tactics (Hoboken: John Wiley & Sons, Inc, 2001)., Chapter 17 – Identifying, Measuring, and Monitoring Liquidity Risk

37. Company XYZ's pension fund has liabilities of USD 100 million and assets of USD 120 million. The annual growth of the liabilities has an expected value of 5% with 3% volatility. The annual return of the assets has an expected value of 8% with 12% volatility. The correlation between asset return and liability growth is 0.3. What is the 95% surplus-at-risk?

a. USD 27.6 million
b. USD 22.7 million
c. USD 13.8 million
d. USD 18.1 million

Answer: d

a. Incorrect. This solution incorrectly uses 2.33 as the 95% multiplier instead of 1.645. This answer is the 99% surplus-at-risk.
b. Incorrect. This solution incorrectly excludes the expected surplus growth of USD 4.6 million (= -100 * 0.05 + 120 * 0.08).
c. Incorrect. This solution incorrectly sets the 95% surplus-at-risk equal to the standard deviation of surplus growth.
d. Correct. The expected surplus growth is -100 * 0.05 + 120 * 0.08 = USD 4.6 million. The variance of surplus growth is -100^2 * 0.03^2 + 120^2 * 0.12^2 + 2 * 100 * 120 * 0.3 * 0.03 * 0.12 = USD 190.44 million, and the standard deviation is USD 13.8 million. Therefore, the 95% surplus-at-risk is -1 * (4.6 - 1.645 * 13.8) = USD 18.1 million.

Reference:
Rahl, Leslie. Risk Budgeting: A New Approach to Investing, Chapter 6, page 110. alternatively, Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed., Chapter 17 – VaR and Risk Budgeting in Investment Management

38. Company EFG is a large derivative market-maker that has many contracts with counterparty JKL, some transacted in the same legal jurisdiction and others across different legal jurisdictions. As a result, EFG has some contracts with JKL covered under legally enforceable netting agreement A, some contracts with JKL covered under legally enforceable netting agreement B, and some contracts with JKL with no netting agreement. Ignoring the effect of margin, if the current value (i.e., market value of the contract minus collateral and recovery value) and the netting agreement status of each contract with JKL are as shown below, what is EFG's current counterparty credit exposure to JKL?

Contract	Netting Agreement Status	Current Value
1	Covered by Netting Agreement A	USD 2,105
2	Covered by Netting Agreement A	(-USD 3,319)
3	Covered by Netting Agreement A	USD 1,977
4	Covered by Netting Agreement B	USD 5,876
5	Covered by Netting Agreement B	(-USD 633)
6	Covered by Netting Agreement B	(-USD 2,335)
7	Covered by Netting Agreement B	USD 4,006
8	Not Covered by any Netting Agreement	USD 2,439
9	Not Covered by any Netting Agreement	(-USD 1,504)

a. USD 8,612
b. USD 6,914
c. USD 14,899
d. USD 2,341

Answer: d

a. Incorrect. This is just the sum of the current values, which ignores both the non-negativity of credit exposures and the effect of the netting agreements.
b. Incorrect. This is the maximum of the four categories of exposures (those covered by A, those covered by B, 8 and 9).
c. Incorrect. This reverses the max and summation function in each case.
d. Correct.

Explanation: Let PVi denote the EFG's current value to JKL of contract i. Given the netting agreement coverage, current counterparty credit exposure to JKL (CE) is:

$$CE = \max(PV_1 + PV_2 + PV_3, 0) + \max(PV_4 + PV_5 + PV6 + PV_7, 0) + \max(PV_8, 0) + \max(PV_9, 0)$$
$$= \max(USD763, 0) + \max(USD6914, 0) + \max(USD2439, 0) + \max(-USD1504, 0)$$
$$= USD763 + USD6914 + USD2439 + 0$$
$$= USD10,116$$

Reference:
"Economic Capital for Counterparty Credit Risk," by Evan Picoult and David Lamb. From Economic Capital: A Practitioner Guide, edited by Ashish Dev, chapter 7, pp. 113-114.

39. Large banks typically allocate risk capital for credit, operational and market/ALM risks. Which of the following statements ranks the typical amount of risk capital allocated to these different risks correctly starting with the largest amount?

a. Market/ALM risk requires more risk capital than credit risk.
b. Credit risk requires more risk capital than market/ALM risk which requires more risk capital than operational risk.
c. Market/ALM risk requires more risk capital than operational risk but less than credit risk.
d. Credit risk requires more risk capital than operational risk which requires more risk capital than market/ALM.

Answer: d

Reference:
"Risk Measurement, Risk Management, and Capital Adequacy in Financial Conglomerates," by Andrew Kuritzkes, Til Schuermann and Scott M. Weiner.

40. The DataSoft Corporation has an employee pension scheme with fixed liabilities and a long time horizon reflecting its young workforce. The fund's assets are USD 9 billion and the present value of its liabilities is USD 8.8 billion.

Which of the following statements is/are incorrect?

I. The present value of long-term fixed payments behaves very much like a long position in a fixed rate bond.
II. Surplus at Risk is a measure of relative risk.
III. The DataSoft Corporation will be able to immunize its liabilities by investing USD 8 billion in long-term fixed rate bonds.

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

Answer: c

I. Incorrect. The present value of long-term fixed payments behaves very much like a short position in a fixed rate bond.
II. Correct. Surplus at Risk is a measure of relative risk.
III. Incorrect. The DataSoft Corporation will be able to immunize its liabilities by investing USD 8.8 billion in long-term fixed rate bonds.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed., Chapter 17 – VaR and Risk Budgeting in Investment Management

2008 FRM® Practice EXAM II

2008 FRM PRACTICE EXAM II: CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○
16.	○	○	○	○
17.	○	○	○	○
18.	○	○	○	○
19.	○	○	○	○
20.	○	○	○	○
21.	○	○	○	○
22.	○	○	○	○

	a.	b.	c.	d.
23.	○	○	○	○
24.	○	○	○	○
25.	○	○	○	○
26.	○	○	○	○
27.	○	○	○	○
28.	○	○	○	○
29.	○	○	○	○
30.	○	○	○	○
31.	○	○	○	○
32.	○	○	○	○
33.	○	○	○	○
34.	○	○	○	○
35.	○	○	○	○
36.	○	○	○	○
37.	○	○	○	○
38.	○	○	○	○
39.	○	○	○	○
40.	○	○	○	○

Correct way to complete

1. ● ● ● ●

Wrong way to complete

1. ⊘ ⊖ ✓ ✘

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1. Given the below data for the US dollar and Canadian dollar exchange rates, which of the following statements is true? E[CAD|USD Rate] and E[USD|CAD Rate] denote the mean of the CAD|USD Rate and USD|CAD Rate, respectively.

Level	CAD|USD	USD|CAD
Current	1.0	1.0000000
Up	1.1	0.9090909
Down	0.9	1.1111111
Mean	1.0	1.0101010

a. E[CAD|USD Rate] = 1/E[USD|CAD Rate]
b. E[USD|CAD Rate] >= 1/E[CAD|USD Rate]
c. E[USD|CAD Rate] <= 1/E[CAD|USD Rate]
d. E[CAD|USD Rate] = E[USD|CAD Rate]

2. The following statements about combating model risk are true, except?

I. If a position is known to have considerable model risk, a firm can limit its exposure to this source of model risk by imposing a tighter position limit.
II. If we always choose the model that takes into account the largest number of real-world factors that affect prices, this will help to reduce the firm's exposure to model risk.
III. Running regular stress tests or scenario analyses to test the volatility, correlation and liquidity assumptions in models helps reduce model risk.
IV. Risk managers should check the traders' pricing models, ensuring model calibration is up-to-date and that models are upgraded in line with market best practice, and to ensure that obsolete models are identified and taken out of use.

a. None are true
b. II only
c. I, III and IV
d. I, II and III

3. In an attempt to provide guidance on the additional steps to be taken by the private sector to promote the efficiency, effectiveness and stability of the global financial system, the Counterparty Risk Management Policy Group II (CRMPG II) published a report in July 2005 containing recommendations and guiding principles. According to the CRMPG II report, which of the following statements relating to Emerging Issues is incorrect?

a. CRMPG II recommends that fiduciaries taking on risks associated with complex products should have the ability to aggregate risk across their entire pool of assets in order to understand portfolio level implications.
b. CRMPG II recommends that hedge funds, on a voluntary basis, adopt the relevant Recommendations and Guiding Principles contained in their (CRMPG II) report.
c. As a guiding principle in selling structured products to retail investors, financial intermediaries should consider whether disclosure appropriately conveys the fact that the secondary market value, at maturity, will be less than the issue price.
d. As a guiding principle, senior management should conduct periodic reviews of the financial intermediary's internal controls for the sale of complex products to retail investors.

4. Consider a 6-month futures contract on the S&P 500, and suppose the current value of the index is 1330. Suppose the dividend yield is 1.5% annually for the stocks underlying the index, and that the continuously compounded risk-free interest rate is 5.5% annually. What is the cost of carry for this futures contract?

a. 4.0%
b. -4.0%
c. 2.0%
d. -2.0%

5. Which of the following factors will not necessarily increase the price of a European call option on a dividend paying stock as this factor increases in value?

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

6. In the Basel II Standardized Approach for operational risk, the beta factor serves as a proxy for the industry-wide relationship between the operational risk loss experience for a given business line and the aggregate level of gross income for that business line. Which of the following business lines has the highest beta factor?

a. Corporate finance
b. Retail banking
c. Commercial banking
d. Asset management

7. You want to implement a portfolio insurance strategy using index futures designed to protect the value of a portfolio of stocks not paying any dividends. Assuming the value of your stock portfolio decreases, which strategy would you implement to protect your portfolio?

a. Buy an amount of index futures equivalent to the change in the call delta x original portfolio value.
b. Sell an amount of index futures equivalent to the change in the call delta x original portfolio value.
c. Buy an amount of index futures equivalent to the change in the put delta x original portfolio value.
d. Sell an amount of index futures equivalent to the change in the put delta x original portfolio value.

8. Using a daily RiskMetrics EWMA model with a decay factor $\lambda = 0.95$ to develop a forecast of the conditional variance, which weight will be applied to the return that is 4 days old?

a. 0.000
b. 0.043
c. 0.048
d. 0.950

9. Which of the following statements about credit risk models is most accurate?

a. KMV models offer a structural approach to measuring credit risk that is based on credit migration.
b. CreditRisk+ models offer an actuarial approach to measuring credit risk that treats the bankruptcy and recovery processes as endogenous.
c. KMV models are an extension of Merton's Option Pricing Model employing equity price volatility as a proxy for asset price volatility.
d. CreditRisk+ models, like the reduced-form models, use a chi-square distribution to describe default.

10. Suppose the daily returns of a portfolio and a benchmark portfolio it is replicating are as follows:

	Portfolio Return (bps)	Benchmark Portfolio Return (bps)
Day 1	34	30
Day 2	-89	-87
Day 3	108	102
Day 4	70	70

What is the tracking error over the four day period?

a. 3.16 bps
b. 2 bps
c. 10 bps
d. 2.39 bps

11. Assume that a portfolio underperformed its benchmark by 2% in the most recent month. In this scenario,

a. Alpha is "-2%" as it refers to the Outperformance / Underperformance Gap.
b. Due to underperformance, Alpha is definitely negative and cannot be positive.
c. Alpha may be positive or negative depending upon Beta and Risk Free Rate.
d. Alpha is 2%.

12. Assume you have empirical data showing historical returns v for a given financial variable (e.g.: Forex rate), how could you perform a quick test of the validity of the power law $Pr\,ob(v > x) = Kx^{-a}$ where x is large, as a good model of the tail of the distribution?

a. Plot the probability of v exceeding x standard deviations against x
b. Plot the probability of v exceeding x standard deviations against Log of x
c. Plot the Log of the probability of v exceeding x standard deviations against x
d. Plot the Log of the probability of v exceeding x standard deviations against the Log of x

13. Given the following portfolio of bonds:

Bond	Price	Par amount held (in USD million)	Modified duration
A	101.43	3	2.36
B	84.89	5	4.13
C	121.87	8	6.27

What is the value of the portfolio's DV01 (Dollar value of 1 basis point)?

a. 8,019
b. 8,294
c. 8,584
d. 8,813

14. Assume that Akshaya Bank has a loan with a principal amount of USD 100 million outstanding to Brazil, due 6 months from now, and the loan has a present value of USD 100.51 million. Brazil declares its inability to meet its payment schedule and Akshaya Bank immediately negotiates a multi-year restructuring agreement with the following terms:

Principal Repayment:	Bullet to 2 years.
Loan Rate:	6% fixed, annual pay.
Upfront fee:	50 basis point.
Akshaya Bank's discount rate:	8%
Guarantees and Options:	None.

Based on the given information, Akshaya Bank's concessionality is close to:

a. USD 96.93 million
b. USD 4.08 million
c. USD 96.43 million
d. USD 3.58 million

15. Which of the following model(s) calculates the change in portfolio value due to rating migration of the underlying instruments?

a. CreditRisk+
b. CreditMetrics
c. KMV
d. Both 'a' and 'c' above are true

16. Jeff is an arbitrage trader, and he wants to calculate the implied dividend yield on a stock while looking at the over-the-counter price of a 5-year put and call (both European-style) on that same stock. He has the following data:

- Initial stock price = USD 85
- Strike price = USD 90
- Continuous risk-free rate = 5%
- Underlying stock volatility = unknown
- Call price = USD 10
- Put price = USD 15

What is the continuous implied dividend yield of that stock?

a. 2.48%
b. 4.69%
c. 5.34%
d. 7.71%

17. A junior bond with a face value of 200 matures in 5 years. A senior bond on the same firms also matures in 5 years, and has a face value of 100. Assume $_{-A}$ = .5 and the riskfree rate=.04. Firm value is equal to 400. Using the Merton model, what is the value of the junior bond? (The following table includes figures that will reduce the time required to answer this but it also includes figures that are irrelevant to the problem and some that are strictly wrong).

d_1	d_2	$N(d_1)$	$N(d_2)$
1.978	0.860	.9761	.8051
1.978	0.860	.8051	.9761
0.9952	-.1228	.8413	.5478
0.9952	-1.505	.8413	.0661
0.9952	-.1228	.8413	.4522

a. 99.07
b. 174.55
c. 75.48
d. 16.63

18. Suppose the standard deviation of a normal population is known to be 10 and the mean is hypothesized to be 8. Suppose a sample size of 100 is considered. What is the range of sample means that allows the hypothesis to be accepted at a level of significance of 0.05?

a. Between -11.60 and 27.60
b. Between 6.04 and 9.96
c. Between 6.355 and 9.645
d. Between -8.45 and 24.45

19. On a due diligence visit, the manager of an arbitrage fixed-income fund claims that his fund has very low risk. He tells you that the fund invests in mortgage-backed inverse floaters issued in the U.S. The current value of the long positions of the fund is roughly USD 100 million. Typically, the fund buys inverse floaters that are undervalued and hedges them so that the position is not sensitive to interest rate changes using the nearest maturity futures contract on the 10-year T-Note. The fund captures the difference between the inverse floater and the hedge portfolio when it puts on the position. You are told that the only risk arises because the fund might have to sell the hedged position. He calls this LTCM risk. Which of the following risks not discussed by the manager can affect significantly the return of the hedge fund?

I. Model risk because the prepayment model used by the fund might be wrong.
II. Default risk because the hedging strategy assumes that the inverse floaters have no default risk.
III. Liquidity risk because the hedge fund uses the nearest futures contract on the 10-year T-Note to hedge interest rate risk and trading price impact may not be possible in that contract in times of stress.
IV. Volatility risk because shocks to interest rate volatility will affect the inverse floaters but cannot typically be hedged with the 10-year T-Note contract.

a. Only risks I and IV are present.
b. Only risks I, III and IV are present.
c. Only risks I, II and IV are present.
d. Only risks I and III are present.

20. You have entered into a currency swap in which you receive 4% per annum in yen and pay 6% per annum in dollars once a year. The principals in the two currencies are 100 million yen and 10 million dollar. The swap will last for another two years, and the current exchange rate is 115 yen for 1 dollar. Suppose that the annualized spot rates (with continuous compounding) are given as in the table below, what is the value of the swap to you in million dollars?

	1 Year	2 Year
Japan	2.00%	2.50%
United States	4.50%	4.75%

a. -1.270.
b. -0.447.
c. 0.447.
d. 1.270.

21. The dividend yield of an asset is 10% per annum. What is the delta of a long forward contract on the asset with 6-month to maturity?

a. 0.95
b. 1.00
c. 1.05
d. Can not be determined without further information.

22. Which of the following statements is not correct?

a. The more the firm hedges its financial exposures, the less equity it requires to support its business.
b. In order to maximize the value, a firm must hedge its financial exposure irrespective of its capital structure.
c. The use of risk management to reduce financial exposures effectively increases a firm's debt capacity.
d. Decisions to hedge financial exposures should be made jointly with the company's capital structure decisions.

23. A bank credit officer, who has reviewed a loan application, has made the following statement: "On a stand alone basis, I was not very keen on granting this loan however, I granted this loan after looking at the overall asset portfolio of the bank." Based on the above statement, which of the following is true.

a. The correlation of the newly granted loan with the overall portfolio is low and therefore the credit officer was right in granting the loan.
b. The correlation of the newly granted loan with the overall portfolio is low and therefore the credit officer was wrong in granting the loan.
c. The correlation of the newly granted loan with the overall portfolio is high and therefore the credit officer was right in granting the loan.
d. The correlation of the newly granted loan with the overall portfolio is high and therefore the credit officer was wrong in granting the loan.

24. As the newly appointed head of operational risk for a large international bank, you must evaluate the company's current approach to estimating the firm-wide operational loss distribution. The bank's current approach is a bottoms-up process in which for each trading desk the operational loss severity distribution is estimated by fitting historical loss magnitude data to a Weibull distribution and the operational loss frequency distribution is estimated by fitting historical loss timing data to a Poisson distribution. Each trading desk's operational loss distribution is then estimated by aggregating the frequency and severity distributions using convolution. Finally, the firm-wide operational loss distribution is estimated using a copula function generated through Monte Carlo simulation. In evaluating this process, which of the following assumptions implied by the current approach will require further investigation?

I. The independence of operational loss events of each particular trading desk.
II. The independence of the frequency of operational loss events and the severity of operational loss events of each particular trading desk.
III. The independence of operational loss events between trading desks.
IV. The reliability and sufficiency of historical loss data for each trading desk.

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

25. Suppose a portfolio consists of a USD 1 million investment in Euros and a USD 4 million investment in Mexican Pesos. Additional information is given below:

- Portfolio beta of Euro = 0.90
- Portfolio beta of Peso = 1.30
- Diversified Portfolio VaR = USD 324,700

Based on the given information, the marginal VaR and the component VaR of the Euro position are closest to:

	Marginal VaR	**Component VaR**
a.	USD 0.058	USD 58,446
b.	USD 0.292	USD 292,230
c.	USD 0.084	USD 337,688
d.	USD 0.106	USD 422,110

26. Which of the following is most accurate with respect to Delta-Normal VaR?

a. The delta-normal method provides accurate estimates of VaR for assets that can be expressed as a linear or non-linear combination of normally distributed risk factors.
b. The delta-normal method provides accurate estimates of VaR for options that are at-or-near-the-money and close to expiration.
c. he delta-normal method provides accurate estimates of VaR by generating a covariance (correlation) matrix and measuring VaR using relatively simple matrix multiplication.
d. The delta-normal method provides accurate estimates of VaR for options and other derivatives over ranges even if deltas are unstable.

27. If interest rates rise, a bank with a positive maturity gap will experience:

a. A gain in equity capital.
b. A loss of equity capital.
c. Either a gain or a loss of equity capital.
d. No change in equity capital.

28. The Thai default in 1997 was unusual compared to past sovereign defaults because:

a. The country repudiated its debt, whereas most defaults are reschedulings
b. The country had a low inflation level, whereas most previous defaults had high inflation, largely as the result of fiscal deficits
c. The country had a strong banking system, whereas most previous defaults arose from weakness in the financial intermediation arena.
d. The country was a strong exporter prior to the crisis, whereas most defaulting countries were net importers.

29. A bond with a face value of 300 matures in 10 years, and it is calculated to be worth 150 using the Merton model. The risk-free rate is 5%. What is the bond's spread?

a. 693bp
b. 1193 bp.
c. 193 bp
d. 2bp

30. You are the CRO of a financial intermediary acting on behalf of Big Bank in an advisory capacity providing advice on Big Bank's acquisition of Global Financial Services, a firm primarily engaged in back office transaction processing. Your firm also represents South American Associates which is looking to expand its revenue stream and has mentioned to you that they are considering making Global Financials Services an acquisition target. You are now losing sleep as you've been having this vision of a visit from your regulatory authorities asking you to explain what was done to avoid a conflict. You can point to the following steps you've taken as being appropriate:

I. Established a Business Review Process that allows you to document the framework you have followed to allow for ex-post review of the advice you've provided.
II. You called the CRO of South American Associates and told her that your firm is representing Big Bank and that your firm will be careful in what they say to South American.
III. You send an email to the investment banking staff representing Big Bank telling them that South American is in the market for an acquisition such as Global Financial and to make sure they do not share any information with South American.
IV. You decide that you can hold off informing your immediate superior of this potential problem issue until South American has made it clear that it is going to target Global Financial Services.

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

31. You are considering an investment in the mezzanine tranche of a tranched basket default swap (TBDS) constructed from a basket of N assets. The TBDS is structured such that the junior tranche is exposed to the first four defaults, the mezzanine tranche to the fifth, sixth, seventh and eighth defaults, and the senior tranche to the ninth and higher defaults. The risk of this investment increases as:

a. The number of assets in the basket, N, increases and the default correlation of the assets becomes closer to zero.
b. The number of assets in the basket, N, increases and the default correlation of the assets becomes more negative.
c. The number of assets in the basket, N, decreases and the default correlation of the assets becomes closer to zero.
d. The number of assets in the basket, N, decreases and the default correlation of the assets approaches becomes negative.

Answer questions 32 and 33 based upon the following information.
A risk manager for ABC Bank has compiled the following data regarding a bond trader and an equity trader. Assume return is normally distributed.

ABC Bank Data – $millions

	After-Tax Profit	Net Book Market Value	Weekly Volatility	Tax Rate
Bond Trader	USD 8	USD 120	1.1%	40%
Equity Trader	USD 18	USD 180	1.94%	40%

32. Using ABC Bank Data, calculate the annual Risk Adjusted Return on Capital (RAROC) for the bond trader?

a. 25.24%
b. 36.08%
c. 60.15%
d. 84.92%

33. Using the ABC Bank Data, which of the following statements are correct in relation to the equity trader?

I. The equity trader has an annual, after tax VaR at a 99% confidence level of USD 33.2m.
II. In comparing the RAROC for both traders, the equity trader is performing better than the bond trader

a. I only
b. II only
c. Both
d. Neither

34. The bid-ask spread is a big determinant of liquidity risk. The bid-ask spread, in turn, reflects the costs of "the supply of immediacy" in a market. Which of the following are not variable costs to dealers of supplying immediacy? (Variable costs mean that the cost to dealers rises as the number of transactions or the demand for immediacy rises.)

a. Operational and administrative costs for processing order flow.
b. Credit surveillance costs for counter party credit worthiness.
c. Inventory carry costs.
d. Hedging costs.

35. A department store chain has a B1 rating from Moody's and a B+ rating from S&P. Its balance sheet reflects a large number of receivables from shoppers who use the chain's private label credit card. The firm has decided to raise much needed funds for renovation via securitization of these receivables. Which of the following scenarios is the most likely outcome?

a. The bond issued in the securitization will be B1/B+ rated because the department store chain is so rated.
b. The asset-backed security (ABS) will be have a senior tranche that is rated investment-grade and whose face value is lower than the value of the receivables that were on the firm's balance sheet.
c. The asset-backed security (ABS) will be overcollateralized with the receivables that had been on the firm's balance sheet and are now a liability of the special purpose entity (SPE).
d. The securitization will result in a bond with two tranches; one which is senior and receives a Ba3/BB- rating, and another which is junior and receives a B2/B-.

36. Which of the following statements about Extreme Value Theory (EVT) and its application to value at risk are true?

I. EVT extends the Central Limit Theorem to the distribution of the tails of independent, identically distributed random variables drawn from an unknown distribution.
II. For empirical stock market data, the shape parameter in EVT is negative implying tails that disappear more rapidly than a normal distribution.
III. EVT can help avoid a shortcoming of the historical simulation method which may have difficulty calculating VaR reliably due to a lack of data in the tails.
IV. For empirical stock market data, standard value at risk estimates at the 95 percent confidence level are exceeded more often than 5 percent of the time and would therefore benefit from the use of extreme value theory.

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

37. Which of the following cases of losses was not the result of unauthorized or rogue trading?

a. Long-Term Capital Management
b. Allied Irish Bank
c. Sumitomo
d. Daiwa

38. Assume the marginal monthly default rates (conditional on no previous default) for a firm are 2% each month during the first year and 3% each month during the second year. What is the marginal probability of defaulting over the second year, conditional on not having defaulted the first year?

a. Insufficient information to answer the question
b. 30.6%
c. 36.0%
d. 47.4%

39. Which of the following statements correctly describes the risks of commercial banking?

I. Commercial banking is more exposed to operational risk than credit risk.
II. Commercial banking is less exposed to market risk than operational risk.
III. Commercial banking is more exposed to credit risk than market risk.

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

40. Which of the following is true about stress testing?

a. It is used to evaluate the potential impact on portfolio values of unlikely, although plausible, events or movements in a set of financial variables.
b. It is a risk-management tool that directly compares predicted results to observed actual results. Predicted values are also compared with historical data.
c. Both 'a' and 'b' above are true
d. None of the above are true

2008 FRM PRACTICE EXAM II: CORRECT CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	●	○	○
2.	○	●	○	○
3.	○	○	●	○
4.	●	○	○	○
5.	○	○	●	○
6.	●	○	○	○
7.	○	○	○	●
8.	○	●	○	○
9.	○	○	●	○
10.	●	○	○	○
11.	○	○	●	○
12.	○	○	○	●
13.	○	○	●	○
14.	○	○	○	●
15.	○	●	○	○
16.	○	○	●	○
17.	●	○	○	○
18.	○	●	○	○
19.	●	○	○	○
20.	●	○	○	○
21.	●	○	○	○
22.	○	●	○	○

	a.	b.	c.	d.
23.	●	○	○	○
24.	○	●	○	○
25.	●	○	○	○
26.	○	○	●	○
27.	○	●	○	○
28.	○	●	○	○
29.	○	○	●	○
30.	●	○	○	○
31.	○	●	○	○
32.	○	○	○	●
33.	○	○	○	●
34.	○	●	○	○
35.	○	●	○	○
36.	●	○	○	○
37.	●	○	○	○
38.	○	●	○	○
39.	●	○	○	○
40.	●	○	○	○

Correct way to complete

1. ● ● ● ●

Wrong way to complete

1. ⊘ ⊖ ✓ ✘

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2008 FRM PRACTICE EXAM II: ANSWERS AND EXPLANATIONS

1. Given the below data for the US dollar and Canadian dollar exchange rates, which of the following statements is true? E[CAD|USD Rate] and E[USD|CAD Rate] denote the mean of the CAD|USD Rate and USD|CAD Rate, respectively.

Level	CAD|USD	USD|CAD
Current	1.0	1.0000000
Up	1.1	0.9090909
Down	0.9	1.1111111
Mean	1.0	1.0101010

a. E[CAD|USD Rate] = 1/E[USD|CAD Rate]
b. E[USD|CAD Rate] >= 1/E[CAD|USD Rate]
c. E[USD|CAD Rate] <= 1/E[CAD|USD Rate]
d. E[CAD|USD Rate] = E[USD|CAD Rate]

Answer: b

a. Incorrect. As 1 does not equal 1/1.0101010.
b. Correct, as 1.0101010 is greater than or equal to 1/1. This is due to Jensen's Inequality, which says that for any convex function the expectation of f(x) is greater than or equal to the function evaluated at the expectation of x.
c. Incorrect. As 1.0101010 is not less than or equal to 1.
d. Incorrect. As 1 is not equal to 1.0101010.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 21

2. The following statements about combating model risk are true, except?

I. If a position is known to have considerable model risk, a firm can limit its exposure to this source of model risk by imposing a tighter position limit.
II. If we always choose the model that takes into account the largest number of real-world factors that affect prices, this will help to reduce the firm's exposure to model risk.
III. Running regular stress tests or scenario analyses to test the volatility, correlation and liquidity assumptions in models helps reduce model risk.
IV. Risk managers should check the traders' pricing models, ensuring model calibration is up-to-date and that models are upgraded in line with market best practice, and to ensure that obsolete models are identified and taken out of use.

a. None are true
b. II only
c. I, III and IV
d. I, II and III

Answer: b

a. I is correct because by considering potential model risk exposure in setting position limits is one of the institutional methods of dealing with model risk highlighted in the chapter of model risk by Kevin Dowd.
b. II is wrong and take note this is exactly what the question is asking for! Statement (II) is wrong because unnecessary complexity is never a virtue, in fact, exposure to model risk is reduced if practitioners always choose the simplest reasonable model for the task at hand.
c. III is correct because by running regular stress tests can help to determine prospective losses if the models' assumptions don't hold and the scenario analyses help to test the degree of dependence on particular assumptions.
d. IV is correct because it has always been risk management best practice to have independent assessment of traders' models by risk managers, and to prevent traders from hiding losses by manipulating their own models. This statement is quoted as a way to combat model risk in the Kevin Dowd's book.

Common mistakes: If a candidate is careless and fails to realize that the question is actually asking for an incorrect statement, he may choose a safe bet and pick answer 'a' as it covers all the four statements which look correct on the surface. Or he may pick answer 'd' if he thinks he is supposed to look for correct statements and statement (IV) looks like a tall order for risk managers who may not have the same level of competency as traders. If a candidate is careless and thinks that he is supposed to look for correct statements, he may spot the error in statement (II) and pick all the correct remaining statements and choose answer 'c'.

Reference:
Kevin Dowd, Measuring Market Risk, 2nd ed., (West Sussex: John Wiley & Sons, Inc., 2005)., Chapter 16 – Model Risk

3. In an attempt to provide guidance on the additional steps to be taken by the private sector to promote the efficiency, effectiveness and stability of the global financial system, the Counterparty Risk Management Policy Group II (CRMPG II) published a report in July 2005 containing recommendations and guiding principles. According to the CRMPG II report, which of the following statements relating to Emerging Issues is incorrect?

a. CRMPG II recommends that fiduciaries taking on risks associated with complex products should have the ability to aggregate risk across their entire pool of assets in order to understand portfolio level implications.
b. CRMPG II recommends that hedge funds, on a voluntary basis, adopt the relevant Recommendations and Guiding Principles contained in their (CRMPG II) report.
c. As a guiding principle in selling structured products to retail investors, financial intermediaries should consider whether disclosure appropriately conveys the fact that the secondary market value, at maturity, will be less than the issue price.
d. As a guiding principle, senior management should conduct periodic reviews of the financial intermediary's internal controls for the sale of complex products to retail investors.

Answer: c

a. Is incorrect. Because the statement is correct according to CRMPG II report. This basically comes from the New Prudent Man Rule as opposed to the traditional Fiduciary Rule.
b. Is incorrect. Because the statement is correct according to CRMPG II report. This recommendation is an effort to promote the efficiency, effectiveness and stability of the global financial system.
c. Is correct. Per CRMPG II report, disclosure should relate to the secondary market value at or near issuance (not at maturity).
d. Is incorrect. Because the statement is correct according to CRMPG II report. This is the essence of Sarbanes-Oxley requirement.

Reference:
Counterparty Risk Management Policy Group II, Toward Greater Financial Stability: A Private Sector Perspective. The Report of the Counterparty Risk Management Policy Group II"., Section I – Introduction

4. Consider a 6-month futures contract on the S&P 500, and suppose the current value of the index is 1330. Suppose the dividend yield is 1.5% annually for the stocks underlying the index, and that the continuously compounded risk-free interest rate is 5.5% annually. What is the cost of carry for this futures contract?

a. 4.0%
b. -4.0%
c. 2.0%
d. -2.0%

Answer: a

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 5 – Determination of Forward and Futures Prices

5. Which of the following factors will not necessarily increase the price of a European call option on a dividend paying stock as this factor increases in value?

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

Answer: c

a. Incorrect. An increase in the risk free rate will decrease PV(X) and necessarily increase the price of the European call.
b. Incorrect. An increase in the stock price will necessarily increase the price of the European call.
c. Correct. Because dividends paid before the expiration of the option might decrease the value of the stock price, it is possible that the value of the call option will decrease as the time to expiration is increased passed scheduled dividend payout dates.
d. Incorrect. An increase in the underlying stock price will necessarily increase the price of the European call.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 9 – Properties of Stock Options

6. In the Basel II Standardized Approach for operational risk, the beta factor serves as a proxy for the industry-wide relationship between the operational risk loss experience for a given business line and the aggregate level of gross income for that business line. Which of the following business lines has the highest beta factor?

a. Corporate finance
b. Retail banking
c. Commercial banking
d. Asset management

Answer: a

a. Correct. As it has the highest Beta factor of 18%.
b. Incorrect. As it has a Beta factor of 12%.
c. Incorrect. As it has a Beta factor of 15%.
d. Incorrect. As it has a Beta factor of 12%.

Reference:
Basel Committee on Banking Supervision. " Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for International Settlements, November 2005, paras 653 and 654.

7. You want to implement a portfolio insurance strategy using index futures designed to protect the value of a portfolio of stocks not paying any dividends. Assuming the value of your stock portfolio decreases, which strategy would you implement to protect your portfolio?

a. Buy an amount of index futures equivalent to the change in the call delta x original portfolio value.
b. Sell an amount of index futures equivalent to the change in the call delta x original portfolio value.
c. Buy an amount of index futures equivalent to the change in the put delta x original portfolio value.
d. Sell an amount of index futures equivalent to the change in the put delta x original portfolio value.

Answer: d

a. Incorrect. For portfolio insurance strategy to work, index futures should be sold in an amount corresponding to the change in the put delta x original portfolio value.
b. Incorrect. For portfolio insurance strategy to work, index futures should be sold in an amount corresponding to the change in the put delta x original portfolio value.
c. Incorrect. For portfolio insurance strategy to work, index futures should be sold in an amount corresponding to the change in the put delta x original portfolio value.
d. Correct. Portfolio insurance strategy is accomplished by selling index futures contracts in an amount equivalent to the proportion of the portfolio dictated by the delta of the required put option. When a decrease in the value of the underlying portfolio occurs, the amount of additional index futures sold corresponds to the change in the put delta x original portfolio value.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 15 – The Greek Letters

8. Using a daily RiskMetrics EWMA model with a decay factor $\lambda = 0.95$ to develop a forecast of the conditional variance, which weight will be applied to the return that is 4 days old?

a. 0.000
b. 0.043
c. 0.048
d. 0.950

Answer: b

a. Incorrect. The wrong factor has been squared. The EWMA RiskMetrics model is defined as $h_t = \lambda * h_{t-1} + (1- \lambda) * r^3_{t-1}$. For t = 4, and processing r_0 through the equation three times produces a factor of (1-0.95)^3*0.95 = 0.000 for r0 when t = 4.

b. Correct. The EWMA RiskMetrics model is defined as $h_t = \lambda * h_{t-1} + (1- \lambda) * r^3_{t-1}$. For t=4, and processing r0 through the equation three times produces a factor of (1-0.95)*0.95^3 = 0.043 for r_0 when t = 4.

c. Incorrect. The 0.95 has not been squared. The EWMA RiskMetrics model is defined as $ht = \lambda * h_{t-1} + (1- \lambda) * r^3_{t-1}$. For t = 4, and processing r0 through the equation three times produces a factor of (1-0.95)*0.95 = 0.048 for r_0 when t = 4.

d. Incorrect. The weight is not simply λ. The EWMA RiskMetrics model is defined as $ht = \lambda * h_{t-1} + (1- \lambda) * r^3_{t-1}$. For t = 4, and processing r_0 through the equation three times produces a factor of 0.95 = 0.950 for r0 when t = 4.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 8.

9. Which of the following statements about credit risk models is most accurate?

a. KMV models offer a structural approach to measuring credit risk that is based on credit migration.
b. CreditRisk+ models offer an actuarial approach to measuring credit risk that treats the bankruptcy and recovery processes as endogenous.
c. KMV models are an extension of Merton's Option Pricing Model employing equity price volatility as a proxy for asset price volatility.
d. CreditRisk+ models, like the reduced-form models, use a chi-square distribution to describe default.

Answer: c

a. Incorrect. KMV models are NOT based on credit migration.
b. Incorrect. In CreditRisk+ models, the bankruptcy/recovery processes are exogenous.
c. Correct. KMV models employ equity price volatility as a proxy for asset price volatility.
d. Incorrect. CreditRisk+ models use a Poisson or Poisson-like distribution to describe default.

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 6 – Credit Risk Portfolio Models

10. Suppose the daily returns of a portfolio and a benchmark portfolio it is replicating are as follows:

	Portfolio Return (bps)	Benchmark Portfolio Return (bps)
Day 1	34	30
Day 2	-89	-87
Day 3	108	102
Day 4	70	70

What is the tracking error over the four day period?

a. 3.16 bps
b. 2 bps
c. 10 bps
d. 2.39 bps

Answer: a

a. Correct. Tracking error is the standard deviation of the difference between the return of the managed portfolio and the benchmark portfolio.

$TE = \text{sigma}\ (R_P - R_B) = [\ E\ [(R_P - R_B)^2] - E\ (R_P - R_B)^2\ ]^{1/2}$
and
$E\ [R_P - R_{B]} = (4 + (-2) + 6 + 0) / 4 = 2.00$
$E\ [(R_P - R_B)]^2 = (16 + 4 + 36 + 0) / 4 = 14.00$

So,
$TE = (14.00 - 4.00)^{1/2} = 3.16$ bps.

b. Incorrect. This solution incorrectly sets the tracking error equal to the average difference between the return of the managed portfolio and the benchmark portfolio. Tracking error is the standard deviation of the difference between the return of the managed portfolio and the benchmark portfolio.

c. Incorrect. This solution incorrectly sets the tracking error equal to the variance of the difference between the return of the managed portfolio and the benchmark portfolio. Tracking error is the standard deviation of the difference between the return of the managed portfolio and the benchmark portfolio.

d. Incorrect. This solution incorrectly sets the tracking error equal to the difference between the standard deviation of the return of the managed portfolio and the standard deviation of the return of the benchmark portfolio. Tracking error is the standard deviation of the difference between the return of the managed portfolio and the benchmark portfolio.

Reference:
Noel Amenc and Veronique Le Sourd, Portfolio Theory and Performance Analysis (West Sussex: Wiley, 2003)., Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

11. Assume that a portfolio underperformed its benchmark by 2% in the most recent month. In this scenario,

a. Alpha is "-2%" as it refers to the Outperformance / Underperformance Gap.
b. Due to underperformance, Alpha is definitely negative and cannot be positive.
c. Alpha may be positive or negative depending upon Beta and Risk Free Rate.
d. Alpha is 2%.

Answer: c

a. Incorrect. Total Portfolio Return equals to, Risk Free Return i.e. RFR + [Beta x (Index return – RFR)] + Alpha. This way, Alpha is residual after reducing RFR and Index or Market Related Return from Total Return. It need not be equal to Underperformance Gap of "-2%".
b. Incorrect. If Beta of Portfolio is much lower, Market Related Return will also be lower. This may result in a Positive Alpha in spite of Underperformance.
c. Correct. A much lower Beta will reduce Market Related Return and in turn, may increase the residual Alpha to positive figure. Similarly, a higher beta may result in higher share of Market related return implying a Negative Alpha. Hence, Alpha may move anywhere depending upon the levels of Beta and RFR.
d. Incorrect. Alpha can be any figure depending upon levels of Beta and RFR. Alpha need not be equal to difference in return of portfolio and index.

Reference:
Noel Amenc and Veronique Le Sourd, Portfolio Theory and Performance Analysis (West Sussex: Wiley, 2003)., Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

12. Assume you have empirical data showing historical returns v for a given financial variable (e.g.: Forex rate), how could you perform a quick test of the validity of the power law Pr ob($v > x$) = Kx^{-a} where x is large, as a good model of the tail of the distribution?

a. Plot the probability of v exceeding x standard deviations against x
b. Plot the probability of v exceeding x standard deviations against Log of x
c. Plot the Log of the probability of v exceeding x standard deviations against x
d. Plot the Log of the probability of v exceeding x standard deviations against the Log of x

Answer: d

The mathematical relationship in the question can be rewritten (by taking the logs on both sides): Log(Pr ob($v > x$)) = Log(K) - aLog(x), i.e. the plot of the Log of the probability of v exceeding x standard deviations against the log of x should be a straight (decreasing) line if the relationship strictly holds. The intercept is an estimate of Log of K and the slope of the line yields the parameter a.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., p. 119-120 and p.224-227

13. Given the following portfolio of bonds:

Bond	Price	Par amount held (in USD million)	Modified duration
A	101.43	3	2.36
B	84.89	5	4.13
C	121.87	8	6.27

What is the value of the portfolio's DV01 (Dollar value of 1 basis point)?

a. 8,019
b. 8,294
c. 8,584
d. 8,813

Answer: c

The portfolio dollar duration of a basis point (DV01)
= (portfolio modified duration X market value of portfolio)/10,000
The portfolio modified duration is obtained by taking the weighted average of the modified duration of the bonds in the portfolio.
Mathematically, it is as follows: $w_1D_1 + w_2D_2 + w_3D_3 + \ldots + w_kD_k$,
where w_i = market value of bond i/market value of the portfolio
D_i = modified duration of bond i
K = number of bonds of the portfolio.

Based on the above, the market values are as follows:
bond A = 101.43 x 3,000,000/100 = 3,042,900
bond B = 84.89 x 5,000,000/100 = 4,244,500
bond C = 121.87 x 8,000,000/100 = 9,749,600

Total market value of the portfolio = 3,042,900 + 4,244,500 + 9,749,600 = 17,037,000

Portfolio modified duration is calculated as follows:
(3,042,900/17,037,000)2.36 + (4,244,500/17,037,000)4.13 + (9,749,600/17,037,000)6.27 =
(0.1786)2.36 + (0.2491)4.13 + (0.5723)6.27 = 0.4215 + 1.0289 + 3.5881 = 5.0385
Therefore, the portfolio dollar duration of a basis point (DV01) is obtained as follows:
(5.0385 x 17,037,000)/10,000 = 8,584

Reference:
Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002)., Chapter 5 – One-Factor Measures of Price Sensitivity

Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002)., Chapter 6 – Measures of Price Sensitivity Based on Parallel Yield Shifts

14. Assume that Akshaya Bank has a loan with a principal amount of USD 100 million outstanding to Brazil, due 6 months from now, and the loan has a present value of USD 100.51 million. Brazil declares its inability to meet its payment schedule and Akshaya Bank immediately negotiates a multi-year restructuring agreement with the following terms:

Principal Repayment:	Bullet to 2 years.
Loan Rate:	6% fixed, annual pay.
Upfront fee:	50 basis point.
Akshaya Bank's discount rate:	8%
Guarantees and Options:	None.

Based on the given information, Akshaya Bank's concessionality is close to:

a. USD 96.93 million
b. USD 4.08 million
c. USD 96.43 million
d. USD 3.58 million

Answer: d

a. Incorrect. Because this is the present value of the restructured loan (and not the concessionality).
b. Incorrect. Because the calculation excludes the upfront fee.
c. Incorrect. Because this is the present value of the restructured loan excluding the upfront fee.
d. Correct.

PV of the restructured loan = [USD 100 x 0.005] + [(USD 0 + (USD 100 x 0.06)) / 1.08] + [(USD 100 + (USD 100 x 0.06)) / 1.08^2] = 0.50 + 5.55 + 90.88 = USD 96.93 million.

Concessionality = USD 100.51 – USD 96.93 = USD 3.58 million.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 16.

15. Which of the following model(s) calculates the change in portfolio value due to rating migration of the underlying instruments?

a. CreditRisk+
b. CreditMetrics
c. KMV
d. Both a and c above are true

Answer: b

a. Incorrect. CreditRisk+ does not calculate the change in portfolio value due to credit migration of the underlying instruments.
b. Correct. CreditMetrics calculates the change in portfolio value due to credit migration of the underlying bond(s) (eg. change in credit spread).
c. Incorrect. KMV does not calculate the change in portfolio value due to credit migration of the underlying instruments.
d. Incorrect. 'a' and 'c' are incorrect.

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 6 – Credit Risk Portfolio Models

16. Jeff is an arbitrage trader, and he wants to calculate the implied dividend yield on a stock while looking at the over-the-counter price of a 5-year put and call (both European-style) on that same stock. He has the following data:

- Initial stock price = USD 85
- Strike price = USD 90
- Continuous risk-free rate = 5%
- Underlying stock volatility = unknown
- Call price = USD 10
- Put price = USD 15

What is the continuous implied dividend yield of that stock?

a. 2.48%
b. 4.69%
c. 5.34%
d. 7.71%

Answer: c

We can use the Put-Call parity here to easily solve for the continuous dividend yield.
We have $C - P = S_0e^{-q*T} - Ke^{-r*T}$, so $10 - 15 = 85e^{-q*5} - 90e^{-0.05*5}$. Solving for q, we get 5.34%.

a. Incorrect. C and P where inverted in the formula.
b. Incorrect. C and P where inverted in the formula, and S and K where also inverted in the formula.
c. Correct. The above formula was used correctly, $C - P = S_0^{e-q*T} - Ke^{-r*T}$.
d. Incorrect. S and K where inverted in the formula.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 13 – The Black-Scholes-Merton Model

17. A junior bond with a face value of 200 matures in 5 years. A senior bond on the same firms also matures in 5 years, and has a face value of 100. Assume $_{-A}$ = .5 and the riskfree rate=.04. Firm value is equal to 400. Using the Merton model, what is the value of the junior bond? (The following table includes figures that will reduce the time required to answer this but it also includes figures that are irrelevant to the problem and some that are strictly wrong).

d_1	d_2	$N(d_1)$	$N(d_2)$
1.978	0.860	.9761	.8051
1.978	0.860	.8051	.9761
0.9952	-.1228	.8413	.5478
0.9952	-1.505	.8413	.0661
0.9952	-.1228	.8413	.4522

a. 99.07
b. 174.55
c. 75.48
d. 16.63

Answer: a

a. Correct. To get this answer use the first and last row of the table to make the calculation of the Black-Scholes formula go faster. Plug in the values given into the B-S formula and use the first row to get the value of the equity if the leverage were just 100 (the face value of the senior bond). Subtract this off 400 to get the value of the senior bond. Plug in the values of the B-S formula assuming a strike of 300 (the total debt) to get the value of the equity. Use the last row of the table to make this go faster. Subtracting the value of the equity and the senior debt from 400 gives us the answer, a.
b. Incorrect. It is the value of the total debt of the firm, not the value of the junior debt alone.
c. Incorrect. It is the value of the senior debt, not the junior debt.
d. Incorrect. It uses the wrong line in the table to calculate the junior debt. It uses the second line instead of the first. One needs to use the B-S to calculate d_1 and d_2 and find their normal distribution values in the table. All of the rows except the second line from the bottom have the correct values of d_1 and d_2 but they do not always have the correct normal distribution value that goes with d_1 and d_2. In particular, the middle line is incorrect because a negative value for d_2 has a normal distribution value that is less than .5. The second line is easily detected as wrong because the normal area for a large number should be larger than that of a small number – here they are reversed.

Reference:
René Stulz, René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 18.

18. Suppose the standard deviation of a normal population is known to be 10 and the mean is hypothesized to be 8. Suppose a sample size of 100 is considered. What is the range of sample means that allows the hypothesis to be accepted at a level of significance of 0.05?

a. Between -11.60 and 27.60
b. Between 6.04 and 9.96
c. Between 6.355 and 9.645
d. Between -8.45 and 24.45

Answer: b

a. Incorrect. This answer is the range of values that contain 95% of observations drawn from a normal distribution of mean 8 and standard deviation 10. However, to accept the hypothesis that the mean is 8 at a 0.05 significance level, the test statistic Z = (X - 8) / (10 / ÷ (n)) must fall between -1.96 and 1.96, where X is the sample mean.
b. Correct. To accept the hypothesis at a 0.05 significance level, the test statistic Z must fall between -1.96 and 1.96 -1.96 ? Z = (X - 8) / (10 / ÷ (100)) ? 1.96, which implies that the sample mean X must be between 6.04 and 9.96.
c. Incorrect. This answer is the range of values the sample mean must fall within to accept the hypothesis at a 0.10 significance level.
d. Incorrect. This answer is the range of values that contain 90% of observations drawn from a normal distribution of mean 8 and standard deviation 10. However, to accept the hypothesis that the mean is 8 at a 0.05 significance level, the test statistic Z = (X - 8) /(10/ ÷(n)) must fall between -1.96 and 1.96, where X is the sample mean.

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 7 – Tests of Hypotheses and Significance

19. On a due diligence visit, the manager of an arbitrage fixed-income fund claims that his fund has very low risk. He tells you that the fund invests in mortgage-backed inverse floaters issued in the U.S. The current value of the long positions of the fund is roughly USD 100 million. Typically, the fund buys inverse floaters that are undervalued and hedges them so that the position is not sensitive to interest rate changes using the nearest maturity futures contract on the 10-year T-Note. The fund captures the difference between the inverse floater and the hedge portfolio when it puts on the position. You are told that the only risk arises because the fund might have to sell the hedged position. He calls this LTCM risk. Which of the following risks not discussed by the manager can affect significantly the return of the hedge fund?

I. Model risk because the prepayment model used by the fund might be wrong.
II. Default risk because the hedging strategy assumes that the inverse floaters have no default risk.
III. Liquidity risk because the hedge fund uses the nearest futures contract on the 10-year T-Note to hedge interest rate risk and trading price impact may not be possible in that contract in times of stress.
IV. Volatility risk because shocks to interest rate volatility will affect the inverse floaters but cannot typically be hedged with the 10-year T-Note contract.

a. Only risks I and IV are present.
b. Only risks I, III and IV are present.
c. Only risks I, II and IV are present.
d. Only risks I and III are present.

Answer: a

There is no default risk on inverse floaters, so 2 is wrong. The risk that one might not be able to trade the nearest 10-year T-Note is trivial. The other risks are important.

Reference:
William Fung and David Hsieh, "The Risk in Fixed-Income Hedge Fund Strategies", Journal of Fixed Income 12, 6-27 (2002)

20. You have entered into a currency swap in which you receive 4% per annum in yen and pay 6% per annum in dollars once a year. The principals in the two currencies are 100 million yen and 10 million dollar. The swap will last for another two years, and the current exchange rate is 115 yen for 1 dollar. Suppose that the annualized spot rates (with continuous compounding) are given as in the table below, what is the value of the swap to you in million dollars?

	1 Year	2 Year
Japan	2.00%	2.50%
United States	4.50%	4.75%

a. -1.270.
b. -0.447.
c. 0.447.
d. 1.270.

Answer: a

Calculation
(1) The value BY of yen-denominated bond:
$BY = 40\ e^{-(2\%)\,1} + 1040\ e^{-(2.5\%)\,2} = 1028.487$
(2) The value BD of dollar-denominated bond:
$BD = 0.6\ e^{-(4.5\%)\,1} + 10.6\ e^{-(4.75\%)\,2} = 10.213$
(3) The value CY of yen-denominated coupons:
$CY = 40\ e^{-(2\%)\,1} + 40\ e^{-(2.5\%)\,2} = 77.257$
(4) The value CD of dollar-denominated coupons:
$CD = 0.6\ e^{-(4.5\%)\,1} + 0.6\ e^{-(4.75\%)\,2} = 1.119$

a. Correct. Value = $B_Y / 115 - B_D = 1028.487/115 - 10.213 = -1.270$.
b. Incorrect. It's derived by missing to account for the principals:
$77.257/115 - 1.119 = -0.447$
c. Incorrect. It mixes up the values of paying vs. receiving.
d. Incorrect. It mixes up the values of paying vs. receiving and does not account for the principals.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 7 – Swaps

21. The dividend yield of an asset is 10% per annum. What is the delta of a long forward contract on the asset with 6-month to maturity?

a. 0.95
b. 1.00
c. 1.05
d. Can not be determined without further information.

Answer: a

Calculation:
The value of a long forward contract

$f = S_0 e^{-qT} - K e^{-rT}$,

where S_0, q, T, K, and r are the asset price, dividend yield, time to maturity, delivery price, and risk-free rate, respectively.

It follows that the delta of the forward = e^{-qT}.
Given q = 10% and T = 1/2, we have delta = $e^{-10\% / 2} = 0.95$

a. Correct. Shown from the calculations above.
b. Incorrect. Derived erroneously by not accounting for the dividend.
c. Incorrect. Derived erroneously by mixing up the sign of exponential.
d. Incorrect. It can be determined with the given information as shown above.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 15 – The Greek Letters

22. Which of the following statements is not correct?

a. The more the firm hedges its financial exposures, the less equity it requires to support its business.
b. In order to maximize the value, a firm must hedge its financial exposure irrespective of its capital structure.
c. The use of risk management to reduce financial exposures effectively increases a firm's debt capacity.
d. Decisions to hedge financial exposures should be made jointly with the company's capital structure decisions.

Answer: b

Hedging is not a mandatory, i.e. hedging could help some firms to increase shareholder value, while for other firms, leaving exposures unhedged or selectively hedged while maintaining more equity may be the value-maximizing strategy. Therefore, consideration of capital structure plays a vital role in hedging decisions.

Reference:
René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 3 – Creating Value with Risk Management

René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 4 – A Firm-Wide Approach to Risk Management

23. A bank credit officer, who has reviewed a loan application, has made the following statement: "On a stand alone basis, I was not very keen on granting this loan however, I granted this loan after looking at the overall asset portfolio of the bank." Based on the above statement, which of the following is true.

a. The correlation of the newly granted loan with the overall portfolio is low and therefore the credit officer was right in granting the loan.
b. The correlation of the newly granted loan with the overall portfolio is low and therefore the credit officer was wrong in granting the loan.
c. The correlation of the newly granted loan with the overall portfolio is high and therefore the credit officer was right in granting the loan.
d. The correlation of the newly granted loan with the overall portfolio is high and therefore the credit officer was wrong in granting the loan.

Answer: a

a. Correct. The risk of a loan at the portfolio level is guided by both its systematic risk and unsystematic risk. Therefore low correlation of the new loan with the overall existing portfolio make it better investment decision due to diversifications benefits. Therefore, the credit officer was right in his reasoning.
b. Incorrect. Explained in 'a'.
c. Incorrect. Explained in 'a'.
d. Incorrect. Explained in 'a'.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 16

24. As the newly appointed head of operational risk for a large international bank, you must evaluate the company's current approach to estimating the firm-wide operational loss distribution. The bank's current approach is a bottoms-up process in which for each trading desk the operational loss severity distribution is estimated by fitting historical loss magnitude data to a Weibull distribution and the operational loss frequency distribution is estimated by fitting historical loss timing data to a Poisson distribution. Each trading desk's operational loss distribution is then estimated by aggregating the frequency and severity distributions using convolution. Finally, the firm-wide operational loss distribution is estimated using a copula function generated through Monte Carlo simulation. In evaluating this process, which of the following assumptions implied by the current approach will require further investigation?

I. The independence of operational loss events of each particular trading desk.
II. The independence of the frequency of operational loss events and the severity of operational loss events of each particular trading desk.
III. The independence of operational loss events between trading desks.
IV. The reliability and sufficiency of historical loss data for each trading desk.

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

Answer: b

I. Correct. The frequency of operational loss events is typically assumed to follow a Poisson distribution, but only with the caveat that actual loss events tend to be more correlated than those represented by the theoretical distribution, and investigating whether loss event correlations are too great to assume a Poisson distribution would be prudent.
II. Correct. Using convolution to aggregate severity and frequency distributions assumes independence, so one would want to check that these distributions are in fact uncorrelated.
III. Incorrect. Since the current approach uses a copula function to estimate the firm-wide operational loss distribution, the current approach does not assume independence of operational loss events between trading desks.
IV. Correct. Estimating loss distributions from historical data assumes that the data is both reliable and sufficient to generate an accurate estimate, and investigating the quality of the historical data would be necessary.

Reference:
Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 5 – Extending the VaR Approach to Operational Risk

25. Suppose a portfolio consists of a USD 1 million investment in Euros and a USD 4 million investment in Mexican Pesos. Additional information is given below:

- Portfolio beta of Euro = 0.90
- Portfolio beta of Peso = 1.30
- Diversified Portfolio VaR = USD 324,700

Based on the given information, the marginal VaR and the component VaR of the Euro position are closest to:

	Marginal VaR	Component VaR
a.	USD 0.058	USD 58,446
b.	USD 0.292	USD 292,230
c.	USD 0.084	USD 337,688
d.	USD 0.106	USD 422,110

Answer: a

a. Correct.
Marginal VaR of Euro = (USD 324,700 / USD 5,000,000) x 0.90 = USD 0.058
Component VaR of Euro = USD 324,700 x 0.90 x (1,000,000 / 5,000,000) = USD 58,446

b. Incorrect. Because of the use of incorrect variable and/or incorrect formula.

c. Incorrect. Because of the use of incorrect variable and/or incorrect formula.

d. Incorrect. Because of the use of incorrect variable and/or incorrect formula.

Reference:
Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 1

Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 3

26. Which of the following is most accurate with respect to Delta-Normal VaR?

a. The delta-normal method provides accurate estimates of VaR for assets that can be expressed as a linear or non-linear combination of normally distributed risk factors.
b. The delta-normal method provides accurate estimates of VaR for options that are at-or-near-the-money and close to expiration.
c. The delta-normal method provides accurate estimates of VaR by generating a covariance (correlation) matrix and measuring VaR using relatively simple matrix multiplication.
d. The delta-normal method provides accurate estimates of VaR for options and other derivatives over ranges even if deltas are unstable.

Answer: c

a. Incorrect. Accurate estimates only if the risks can be expressed as a linear combination.
b. Incorrect. Accurate estimates only for deep out-of-the-money and deep in-the-money options (over ranges).
c. Correct. This is the most accurate statement.
d. Incorrect. Accurate estimates only if deltas are stable.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 11 – VaR Mapping

27. If interest rates rise, a bank with a positive maturity gap will experience:

a. A gain in equity capital.
b. A loss of equity capital.
c. Either a gain or a loss of equity capital.
d. No change in equity capital.

Answer: b

a. Incorrect. The Bank will experience a loss of equity capital. See explanation in 'b' below.
b. Correct. A loss of equity capital. If the maturity gap is positive, the assets have a longer weighted-average maturity than the liabilities. If rates rise, the value of the liabilities will fall by less than the value of the assets, and equity capital will decrease.
c. Incorrect. The Bank will experience a loss of equity capital. See explanation in 'b' above.
d. Incorrect. The Bank will experience a loss of equity capital. See explanation in 'b' above.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 8.

28. The Thai default in 1997 was unusual compared to past sovereign defaults because:

a. The country repudiated its debt, where most defaults are reschedulings
b. The country had a low inflation level, where most previous defaults had high inflation, largely as the result of fiscal deficits
c. The country had a strong banking system, where most previous defaults arose from weakness in the financial intermediation arena.
d. The country was a strong exporter prior to the crisis, where most defaulting countries were net importers.

Answer: b

a. Incorrect. Thailand did not repudiate its debt.
b. Correct. Prior to the Asian crisis failure to control inflation was considered the major problem behind sovereign debt crises.
c. Incorrect. The country had a relatively weak banking sector, and probably suffered from poor allocation of credit, due at least in part to cronyism.
d. Incorrect. Earlier defaulters were also strong exporters, such as Peru in the 1970s, which was a strong exporter of copper.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 16 – Sovereign Risk

29. A bond with a face value of 300 matures in 10 years, and it is calculated to be worth 150 using the Merton model. The risk-free rate is 5%. What is the bond's spread?

a. 693 bp
b. 1193 bp
c. 193 bp
d. 2 bp

Answer: c

a. Incorrect. It is the yield of the bond, not its spread. The yield is calculated by multiplying 1/remaining maturity by ln(D/F).
b. Incorrect. It adds the yield to the riskfree rate instead of subtracting it off.
c. Correct. Use the yield in a and subtract off the riskfree rate of 5 to get this.
d. Incorrect. It is the answer one gets by making a mistake in going to basis points and rounding 1.9 bp to 2 bp.

Reference:
René Stulz, René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 18 – Credit Risks and Credit Derivatives

30. You are the CRO of a financial intermediary acting on behalf of Big Bank in an advisory capacity providing advice on Big Bank's acquisition of Global Financial Services, a firm primarily engaged in back office transaction processing. Your firm also represents South American Associates which is looking to expand its revenue stream and has mentioned to you that they are considering making Global Financials Services an acquisition target. You are now losing sleep as you've been having this vision of a visit from your regulatory authorities asking you to explain what was done to avoid a conflict. You can point to the following steps you've taken as being appropriate:

I. Established a Business Review Process that allows you to document the framework you have followed to allow for ex-post review of the advice you've provided.
II. You called the CRO of South American Associates and told her that your firm is representing Big Bank and that your firm will be careful in what they say to South American.
III. You send an email to the investment banking staff representing Big Bank telling them that South American is in the market for an acquisition such as Global Financial and to make sure they do not share any information with South American.
IV. You decide that you can hold off informing your immediate superior of this potential problem issue until South American has made it clear that it is going to target Global Financial Services.

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

Answer: a

I. The establishment of a Business Review Process covers a wide variety of issues including reputation risk, the effectiveness of the conflict management process other financial and conflict issues. It also includes an assessment of the firm's policies and procedures, disclosure practices, suitability standards and employee training programs.
II. This step will not alleviate you of any potential conflict of interest from developing and in fact raises another conflict in that you disclosed your relationship with Big Bank.
III. An email will only alert your banking staff to an issue that may not have been an issue previously, making worse the potential conflict of interest.
IV. The potential conflict of interest is sufficient to bring it to the attention of the appropriate staff within your organization in order to decide how to best proceed irrespective of whether South American has made a definite overture to Global Financial Services. You would not have access to all information necessary to make an informed judgment.

Reference:
Counterparty Risk Management Policy Group II, Toward Greater Financial Stability: A Private Sector Perspective. The Report of the Counterparty Risk Management Policy Group II"., Section III – Risk Management and Risk-Related Disclosure Practices

31. You are considering an investment in the mezzanine tranche of a tranched basket default swap (TBDS) constructed from a basket of N assets. The TBDS is structured such that the junior tranche is exposed to the first four defaults, the mezzanine tranche to the fifth, sixth, seventh and eighth defaults, and the senior tranche to the ninth and higher defaults. The risk of this investment increases as:

a. The number of assets in the basket, N, increases and the default correlation of the assets becomes closer to zero.
b. The number of assets in the basket, N, increases and the default correlation of the assets becomes more negative.
c. The number of assets in the basket, N, decreases and the default correlation of the assets becomes closer to zero.
d. The number of assets in the basket, N, decreases and the default correlation of the assets approaches becomes negative.

Answer: b

Explanation: As the number of assets in the basket increases and the default correlation of the assets becomes more negative, the probability that multiple assets default (and that the fifth default is reached) increases, which implies an increase in the risk of the investment. Similarly, as the default correlation.

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 3 – Synthetic Structures

Answer questions 32 and 33 based upon the following information.
A risk manager for ABC Bank has compiled the following data regarding a bond trader and an equity trader. Assume return is normally distributed.

ABC Bank Data – $millions

	After-Tax Profit	Net Book Market Value	Weekly Volatility	Tax Rate
Bond Trader	USD 8	USD 120	1.1%	40%
Equity Trader	USD 18	USD 180	1.94%	40%

32. Using ABC Bank Data, calculate the annual Risk Adjusted Return on Capital (RAROC) for the bond trader?

a. 25.24%
b. 36.08%
c. 60.15%
d. 84.92%

Answer: d

a. Incorrect
b. Incorrect
c. Incorrect
d. Correct. See the calculation below.

RAROC = Profit/Risk Capital
RAROC = 8/13.3 (See below for the calculation of risk capital)
RAROC = 60.15%
Risk Capital (RC) = VaR
RC = Notional x 2.33 x Weekly Standard Deviation x $\sqrt{52}$ x (1-Tax Rate)
RC = 120,000,000 x 2.33 x 0.011 x $\sqrt{52}$ x (1-0.4)
RC = USD 13,307,080

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 6 – Credit Risk Portfolio Models

33. Using the ABC Bank Data, which of the following statements are correct in relation to the equity trader?

I. The equity trader has an annual, after tax VaR at a 99% confidence level of USD 33.2m.
II. In comparing the RAROC for both traders, the equity trader is performing better than the bond trader

a. I only
b. II only
c. Both
d. Neither

Answer: d

a. Incorrect – statement I is incorrect.
b. Incorrect – statement II is incorrect
c. Incorrect – both statements are incorrect
d. Correct – both statements are in fact incorrect

Note: This question only really requires one calculation – the VAR/RC for the equity trader. Once the candidate has this it is very easy to do the last stage of Profit/RC. It does require the candidate to understand both RAROC and VaR methodologies.

Annual VaR = Notional x 2.33 x Weekly Standard Deviation x $\sqrt{52}$ x (1-Tax Rate)
Annual VaR = \$180,000,000 x 2.33 x 0.0194 x $\sqrt{52}$ x (1-0.40) Annual VaR = \$35,203,275
(A Summary of the previous calculations is provided here. The candidates would have already worked out some of these in the earlier questions)
Previously calculated for the bond trader
RAROC = Profit/Risk Capital
RAROC (Bond Trader) = 8/13.3 (See below for the calculation of risk capital)
RAROC = 60.15%
Risk Capital (RC) = VaR
RC (Bond Trader) = Notional x 2.33 x Weekly Standard Deviation x $\sqrt{52}$ x (1-Tax Rate)
RC (Bond Trader) = 120,000,000 x 2.33 x 0.011 x $\sqrt{52}$ x (1-0.4)
RC (Bond Trader) = \$13,307,080
Already calculated for the equity trader for part I
RC (Equity Trader) = Notional x 2.33 x Weekly Standard Deviation x $\sqrt{52}$ x (1-Tax Rate)
RC (Equity Trader) = 180,000,000 x 2.33 x 0.0194 x $\sqrt{52}$ x (1-0.40)
RC (Equity Trader) = \$35,203,275
Therefore the RAROC for the equity trader is:
RAROC (Equity Trader) = 18/35.2 RAROC (Equity Trader) = 51.13%
Comparing this to the RAROC for the Bond Trader, the bond trader has the superior RAROC of 60.15%

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 6 – Credit Risk Portfolio Models

34. The bid-ask spread is a big determinant of liquidity risk. The bid-ask spread, in turn, reflects the costs of "the supply of immediacy" in a market. Which of the following are not variable costs to dealers of supplying immediacy? (Variable costs mean that the cost to dealers rises as the number of transactions or the demand for immediacy rises.)

a. Operational and administrative costs for processing order flow.
b. Credit surveillance costs for counter party credit worthiness.
c. Inventory carry costs.
d. Hedging costs.

Answer: b

Explanation: This is a fixed cost, not per transaction. Perhaps each transaction must be checked against a fixed limit, but this would be an order processing cost. All the others are big per-transaction costs.

Reference:
Christopher L. Culp, he Risk Management Process: Business Strategy and Tactics (Hoboken: John Wiley & Sons, Inc, 2001)., Chapter 17 – Identifying, Measuring, and Monitoring Liquidity Risk

35. A department store chain has a B1 rating from Moody's and a B+ rating from S&P. Its balance sheet reflects a large number of receivables from shoppers who use the chain's private label credit card. The firm has decided to raise much needed funds for renovation via securitization of these receivables. Which of the following scenarios is the most likely outcome?

a. The bond issued in the securitization will be B1/B+ rated because the department store chain is so rated.
b. The asset-backed security (ABS) will be have a senior tranche that is rated investment-grade and whose face value is lower than the value of the receivables that were on the firm's balance sheet.
c. The asset-backed security (ABS) will be overcollateralized with the receivables that had been on the firm's balance sheet and are now a liability of the special purpose entity (SPE).
d. The securitization will result in a bond with two tranches; one which is senior and receives a Ba3/BB- rating, and another which is junior and receives a B2/B-.

Answer: b

a. Incorrect. Because ABS bonds are rated with respect to the risk of the underlying assets (in this credit card receivables) not the risk of the originator of the assets.
b. Correct. A large fraction of ABSs are structured with senior and sub tranches. The senior is usually AAA because it has the full backing of all the assets in the pool that the SPE owns, while the sub tranche only gets paid back if the senior tranche is paid in full. To ensure that the default risk is lower, the senior tranche is smaller than the pool of receivables backing the bond.
c. Incorrect. Because if over collateralization is used the collateral is an asset of the SPE not a liability
d. Incorrect. Because it is usually the case that at least one of the tranches is investment-grade.

Reference:
Christopher L. Culp, Structured Finance and Insurance: The Art of Managing Capital and Risk (Hoboken: John Wiley & Sons, Inc., 2006)., Chapter 16 – Securitization

36. Which of the following statements about Extreme Value Theory (EVT) and its application to value at risk are true?

I. EVT extends the Central Limit Theorem to the distribution of the tails of independent, identically distributed random variables drawn from an unknown distribution.
II. For empirical stock market data, the shape parameter in EVT is negative implying tails that disappear more rapidly than a normal distribution.
III. EVT can help avoid a shortcoming of the historical simulation method which may have difficulty calculating VaR reliably due to a lack of data in the tails.
IV. For empirical stock market data, standard value at risk estimates at the 95 percent confidence level are exceeded more often than 5 percent of the time and would therefore benefit from the use of extreme value theory.

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

Answer: a

I. Correct. Whereas the Central Limit Theorem concerns the distribution of the average of independent, identically distributed variables drawn from an unknown distribution, EVT deals with the distribution of the tails.
II. Incorrect. The shape parameter in EVT for empirical stock market data is typically between 0.2 and 0.4, implying that the tails disappear more slowly than a normal distribution.
III. Correct. Due to its reliance on historical data which may lack sufficient tail data (i.e., extreme events), reliably calculating VaR with the historical simulation method can be difficult; EVT can help avoid this shortcoming.
IV. Incorrect. For empirical stock market data, standard value at risk estimates at the 95 percent confidence level tend to be fairly accurate, and generally only becomes inaccurate at the 99.5 percent confidence level and beyond.

Reference:
Lampros Kalyvas and Ioannis Akkizidis, Integrated Market, Credit and Operational Risk: A Complete Guide for Bankers and Risk Professionals (London: Risk Books, 2006)., Chapter 4 – Extreme Value Theory and in Risk Management

37. Which of the following cases of losses was not the result of unauthorized or rogue trading?

a. Long-Term Capital Management
b. Allied Irish Bank
c. Sumitomo
d. Daiwa

Answer: a

a. LTCM was an example of strategies that were deliberately undertaken and approved but that didn't pay off. LTCM was subject to operational risks like model risk, but the trades that led to the losses were not unauthorized.
b. Allied Irish Bank involved a rogue trader making fx trades.
c. Sumitomo's rogue trading in copper killed it.
d. Daiwa had a fixed income rogue doing unauthorized trades.

Reference:
Reto Gallati, Risk Management and Capital Adequacy (New York: McGraw-Hill, 2003)., Chapter 6 – Case Studies

38. Assume the marginal monthly default rates (conditional on no previous default) for a firm are 2% each month during the first year and 3% each month during the second year. What is the marginal probability of defaulting over the second year, conditional on not having defaulted the first year?

a. Insufficient information to answer the question
b. 30.6%
c. 36.0%
d. 47.4%

Answer: b

a. Incorrect. The answer can be calculated with the information given.
b. Correct. Is obtained by first calculating cumulative probabilities of default, and then applying Bayes' theorem.

Cumulative Probability (12 months) = $1 - (1 - 2\%)^{12} = 21.5\%$
Cumulative Probability (24 months) = $1 - (1 - 2\%)^{12} (1 - 3\%)^{12} = 45.6\%$
Conditional Probability (24 months / not defaulted during first 12 months) =

$$\frac{45.6\% - 21.5\%}{1 - 21.5\%} = 30.6\%$$

c. Incorrect. Is obtained as a result of wrong calculations.

Cumulative Probability (12 months) = $12 \cdot 2\% = 24\%$
Cumulative Probability (24 months) = $12 \cdot 2\% + 12 \cdot 3\% = 60\%$
Conditional Probability (24 months / not defaulted during first 12 months) = $60\% - 24\% = 36\%$

d. Incorrect. Is obtained as a result of wrong calculations.

Cumulative Probability (12 months) = $12 \cdot 2\% = 24\%$
Cumulative Probability (24 months) = $12 \cdot 2\% + 12 \cdot 3\% = 60\%$
Conditional Probability (24 months / not defaulted during first 12 months) =

$$\frac{60\% - 24\%}{1 - 24\%} = 47.4\%$$

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 11 – Credit Risk: Individual Loan Risk

39. Which of the following statements correctly describes the risks of commercial banking?

I. Commercial banking is more exposed to operational risk than credit risk.
II. Commercial banking is less exposed to market risk than operational risk.
III. Commercial banking is more exposed to credit risk than market risk.

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

Answer: a

I. Incorrect. Commercial banking is more exposed to credit risk than, operational risk.
II. Correct. Commercial banking is less exposed to market risk than operational risk.
III. Correct also. Commercial banking is more exposed to credit risk than market risk.

Therefore only answer a contains the sole incorrect statement, and so a is the correct answer.

a. Correct. Statement I s the only incorrect statement.
b. Incorrect. Both statements I and II are in fact correct – see above.
c. Incorrect. Statement III is correct – see above.
d. Incorrect. Statement I is incorrect however statement III is correct – see above.

Reference:
Andrew Kuritzkes, Til Schuermann and Scott M. Weiner, "Risk Measurement, Risk Management and Capital Adequacy in Financial Conglomerates, Brookings-Wharton Papers on Financial Services: 2003. Ed. Robert E.

40. Which of the following is true about stress testing?

a. It is used to evaluate the potential impact on portfolio values of unlikely, although plausible, events or movements in a set of financial variables.
b. It is a risk-management tool that directly compares predicted results to observed actual results. Predicted values are also compared with historical data.
c. Both 'a' and 'b' above are true
d. None of the above are true

Answer: a

a. Correct. It describes 'stress testing'.
b. Incorrect. It is not about 'stress testing'.
c. Incorrect. As 'b' is incorrect.
d. Incorrect. As 'a' is correct.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 14 – Stress Testing

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2008 FRM® Practice EXAM III

2008 FRM PRACTICE EXAM III: CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○
16.	○	○	○	○
17.	○	○	○	○
18.	○	○	○	○
19.	○	○	○	○
20.	○	○	○	○
21.	○	○	○	○
22.	○	○	○	○

	a.	b.	c.	d.
23.	○	○	○	○
24.	○	○	○	○
25.	○	○	○	○
26.	○	○	○	○
27.	○	○	○	○
28.	○	○	○	○
29.	○	○	○	○
30.	○	○	○	○
31.	○	○	○	○
32.	○	○	○	○
33.	○	○	○	○
34.	○	○	○	○
35.	○	○	○	○
36.	○	○	○	○
37.	○	○	○	○
38.	○	○	○	○
39.	○	○	○	○
40.	○	○	○	○

Correct way to complete

1. ● ● ● ●

Wrong way to complete

1. ⊘ ⊖ ✓ ✘

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1. Gamma Industries, Inc. issues an inverse floater with a face value of USD 50,000,000 that pays a semiannual coupon of 11.50% minus LIBOR. Gamma Industries intends to execute an arbitrage strategy and earn a profit by selling the notes, using the proceeds to purchase a bond with a fixed semiannual coupon rate of 6.75% a year, and hedging the risk by entering into an appropriate swap. Gamma Industries receives a quote from a swap dealer with a fixed rate of 5.75% and a floating rate of LIBOR. What would be the most appropriate type of swap Gamma Industries, Inc. should enter into to hedge their risk?

a. Pay-fixed, receive-fixed
b. Pay-floating, receive-fixed swap
c. Pay-fix, receive-floating
d. The risk cannot be hedged with a swap

2. An American investor holds a portfolio of French stocks. The market value of the portfolio is €10 million, with a beta of 1.35 relative to the CAC index. In November, the spot value of the CAC index is 4,750. The exchange rate is USD 1.25/€. The dividend yield, euro interest rates, and dollar interest rates are all equal to 4%. Which of the following option strategies would be most appropriate to protect the portfolio against a decline of the euro that week?

March Euro options (all prices in US dollars per €)

Strike	Call euro	Put euro
1.25	0.018	0.022

a. Buy calls with a premium of USD 180,000
b. Buy puts with a premium of USD 220,000
c. Sell calls with a premium of USD 180,000
d. Sell puts with a premium of USD 220,000

3. Which statement best describes correlations and variances in times of financial crisis?

a. There are only marginal changes in correlations and variances in times of crisis and therefore they do not need to be factored into risk management.
b. The diversification benefits decrease as correlations increase and therefore your risk level increases.
c. The diversification benefits increase as correlations decrease and therefore your risk level decreases.
d. VaR estimates using the Riskmetrics approach provide for the effects of increased correlations during periods of crisis and therefore the effects are factored into current positions.

4. Which of the following risks is not included in the Basel II definition of operational risk?

a. Legal Risk.
b. Reputation Risk.
c. Process Failure Risk.
d. Systems Failure Risk.

5. An analyst observes that the market price of a call option is USD 5 higher than the theoretical price dictated by an option pricing model. Assuming the same strike price and time to expiration, what should be the relationship between the market price of a put option and its theoretical price dictated by the option pricing model?

a. The market price will be higher than the theoretical price by USD 5.
b. The market price will be higher than the theoretical price by an amount lower than USD 5.
c. The market price will be lower than the theoretical price by USD 5.
d. The market price will be lower than the theoretical price by an amount lower than USD 5.

6. Which type of option produces discontinuous payoff profiles, meaning that the payoff does not increase or decrease continuously with the underlying asset value?

a. Chooser options.
b. Barrier options.
c. Binary options.
d. Lookback options.

7. Which of the following GARCH models will take the shortest time to revert to its mean?

a. $h_t = 0.05 + 0.03r^2_{t-1} + 0.96h_{t-1}$
b. $h_t = 0.03 + 0.02r^2_{t-1} + 0.95h_{t-1}$
c. $h_t = 0.02 + 0.01r^2_{t-1} + 0.97h_{t-1}$
d. $h_t = 0.01 + 0.01r^2_{t-1} + 0.98h_{t-1}$

8. Which of the following mortgage backed securities has a negative duration?

a. Interest-Only strips (IO).
b. Inverse floater.
c. Mortgage pass-through.
d. Principal-Only strips (PO).

9. Suppose the risk-adjusted return on capital (RAROC) for a project is 14 percent, the risk-free rate is 4 percent, the market return is 13 percent and the firm's equity beta is 1.2. Using adjusted (or second generation) RAROC, the project should

a. Be accepted and the adjusted RAROC is 10%.
b. Be accepted and the adjusted RAROC is 8.33%.
c. Not be accepted and the adjusted RAROC is 10%.
d. Not be accepted and the adjusted RAROC is 8.33%.

10. You are given the following information about an interest rate swap:

- 2-year Term
- Semi-annual payment
- Fixed Rate = 6 %
- Floating Rate = LIBOR + 50 basis points.
- Notional principal USD10 million.

Calculate the net coupon exchange for the **first period** if LIBOR is 5% at the beginning of the period and 5.5% at the end of the period.

a. Fixed rate payer pays USD 0.
b. Fixed rate payer pays USD 25,000.
c. Fixed rate payer pays USD 50,000.
d. Fixed rate payer receives USD 25,000

11. Which of the following statements is false?

a. European-styled call and put options are most affected by changes in vega when they are at-the-money.
b. The delta of a European-styled put option on an underlying stock would move towards zero as the price of the underlying stock rises.
c. The gamma of an at-the-money European-styled option tends to increase as the remaining maturity of the option decreases.
d. Compared to an at-the-money European-styled call option, an out-of-the money European option with the same strike price and remaining maturity would have a greater negative value for theta.

12. The returns of the stocks over the last year in a large portfolio follow a distribution that is approximately normal. An unethical analyst removes some of the very worst performing stocks and produces reports based on the altered portfolio returns. Which of the following statements about the returns of the altered portfolio is/are correct?

I. The distribution of returns of the altered portfolio is likely to be positively skewed
II. The distribution of returns of the altered portfolio is likely to be negatively skewed
III. The mean return is likely to be lower compared to the original portfolio
IV. The median return is likely to be higher compared to the original portfolio

a. I only is correct
b. II and III are correct
c. II and IV are correct
d. I and IV are correct

13. Assume Satya Bank, having a capital of USD 500 million, wants to limit its losses in the energy sector to 6% and in the construction sector to 4.5% of its capital. The LGD rates for the energy and construction sectors are, respectively, 45% and 70%. If Satya Bank wants to strictly adhere to its concentration limit policy, the maximum permitted loan amount to the energy and construction sectors will be:

	Energy	Construction
a.	USD 66.7 million	USD 32.1 million
b.	USD 13.5 million	USD 15.8 million
c.	USD 37.5 million	USD77.8 million
d.	USD 30.0 million	USD 22.5 million

14. Exporters are affected in different ways due to movement in foreign currency value with the base of domestic currency. Which of the following situations provides the maximum benefit to an Exporter?

a. Exporter of goods with elastic demand as the value of foreign currency rises.
b. Exporter of goods with inelastic demand as the value of foreign currency falls.
c. Exporter of goods with inelastic demand as the value of foreign currency rises.
d. Exporter of goods with elastic demand as the value of foreign currency falls.

15. Which of the following statements about the Sortino ratio are valid?

I. The Sortino ratio is more appropriate for asymmetrical return distributions.
II. The Sortino ratio compares the portfolio return to the return of a benchmark portfolio.
III. The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses variance as a risk metric.
IV. The Sortino ratio is defined on the same principles as the Sharpe ratio, but the Sortino ratio replaces the risk free rate with the minimum acceptable return and the standard deviation of returns with the standard deviation of returns below the minimum acceptable return.

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

16. A zero-coupon bond with a maturity of 10 years has an annual effective yield of 10%. What is the closest value for its modified duration?

a. 9
b. 10
c. 100
d. Insufficient Information

17. Which of the following is not a methodology allowed by Basel II committee for measuring Credit Risk?

a. Measure credit risk in a standardized manner, supported by external credit assessments.
b. A methodology, which is subject to the explicit approval of the banks. A supervisor would allow banks to use their internal rating systems for credit risk.
c. Use external ratings for certain assets and use internal ratings for the rest of the assets.
d. None of the above.

18. You are being interviewed for the position of CRO for a large fund-of-funds. You are asked to comment on the risk management approach of the CRO you would replace, James Smith, and who just left to start his own fund-of-funds. To evaluate the risk of a hedge fund that invests in U.S. equities over the coming month, Smith proceeded as follows. Using monthly data, he would regress, using ordinary least-squares, the return of the fund over its history on the return of the S&P 500, the return of a portfolio long growth stocks and short value stocks, and the return of a portfolio long large firms and short small firms. He would then use an EWMA model to forecast volatilities and correlations for the risk factors. Using the exposures of the fund to the risk factors and the standard deviation of the residual of the regression, he would then forecast the volatility of the fund and use the parametric approach assuming normally distributed returns to estimate the one-month VaR of the fund. Which of the following statements are correct?

I. The well-known work of Fama and French tells us that Smith uses an appropriate risk model, so that the risk factors do not need to be changed. However, his approach makes the mistake of ignoring the fact that hedge fund returns are not normally distributed. The correct distribution of the residual should have higher kurtosis than the normal distribution.
II. The estimates of the exposures to the risk factors will often be biased since the returns of many hedge funds exhibit high serial correlation compared to the returns of mutual funds.
III. The model used by Smith will have low explanatory power because hedge funds change exposures to the risk factors he uses often, but the explanatory power could be improved by using additional asset based factors that have been developed in the literature.
IV. Since portfolio holdings for the typical hedge fund change so much, it is hopeless to hope to explain more than a trivial faction of the return of a typical hedge fund using a factor model.

a. Statements I and II are correct.
b. Only statement I is correct.
c. Statements II and III are the only correct statements.
d. Statement IV is the only correct statement.

19. Banks which need to qualify for the IRB approach need to fulfill certain minimum requirements. One of these is "Corporate Governance and Oversight". Under this, credit risk control is an important component. Which of the following is not an area of responsibility of credit risk control function?

a. Testing and monitoring internal grades.
b. Implementing procedures to verify that rating definitions are consistently applied across departments and geographic areas.
c. Reviewing and documenting any changes to the rating process, including the reasons for the changes.
d. Origination of various types of credit exposures.

20. Two comparable (same credit rating, maturity, liquidity, rate) U.S. callable corporate bonds are being analyzed by you. The following data is available for the nominal spread over the U.S. Treasury yield curve and Z spread and option adjusted spread relative to the U.S. Treasury spot curve

	X	Y
Nominal spread	145	130
Z spread	120	115
OAS	100	105

The nominal spread on the comparable option free bonds in the market is 100 basis points. Which of the following statements is correct?

a. X is undervalued.
b. Y is undervalued.
c. X and Y both are undervalued.
d. Neither X nor Y is undervalued.

21. Which one of the following statements on hedging exotic options is **incorrect**?

a. Asian options are more difficult to hedge because they have more extreme gamma towards expiration.
b. Barrier options are more difficult to hedge because delta is liable to be discontinuous at the barrier.
c. The approach of static options replication is to find a portfolio of regular options whose value matches the value of the exotic option on some boundary.
d. The portfolio constructed using static option replication must be unwound when any part of the boundary is reached.

22. Which of the following is not considered an event of default on the reference asset underlying a CDS with the 2003 ISDA documentation?

a. Bankruptcy
b. Restructuring
c. Rating agency downgrade
d Obligation acceleration

23. A factor analysis of the dividend-adjusted returns of ABC Ltd.'s stock price was undertaken to determine which economic factors contributed to its performance. The regression was performed on 460 observations. The results are as follows:

Table 1:

Predictor	Coefficient	Standard Error of Coefficient
Intercept	-.0243	0.005772
All_share_index	.0256	0.017655
Industrial_index	.0469	0.006398
Financial_index	.0012	0.001412

Table 2:

Sum of Squared Regression (SSR)	12,466.47
Sum of Squared Errors (SSE)	1,013.22
Sum of Squared Total (SST)	13,479.69

Which one of the following options correctly describes which variables are significant at the 5% level, and the R2 statistic, respectively?

	Significant Variables at 5% level	R^2 statistic
a.	Intercept; Industrial_index	0.924834
b.	Intercept; Industrial_index	0.075166
c.	All_share_index; Industrial_Index	0.924834
d.	All_share_index; Industrial_Index	0.075166

24. Which of the following is not a distinction between cash and synthetic CDOs?

a. The assets are actually sold to the SPV in a cash CDO but are not in a synthetic CDO.
b. The cash CDO provides exposure to actual assets, whereas a synthetic CDO provides a similar economic exposure through credit derivatives
c. Cash raised from the issuance of securities is used to finance the purchase of the assets in a cash CDO and to collateralize the CDS in a synthetic CDO.
d. Cash CDOs can have at most one layer of subordination, whereas synthetic CDOs can issue many subordinated tranches of securities.

25. Which of the following is not a commonly used method for generating a recovery rate function?

a. Nonparametric kernel estimation.
b. Cubic SPLINE estimation.
c. Assume the recovery rate follows a beta distribution.
d. Estimate conditional densities with generalized method of moments.

26. A market risk manager is monitoring a trader's portfolio which is currently solely long in a series of identical knock-out call options on JPY/USD. These are up-and-out European-style options that will expire in 1 month's time. The strike is at 110.00 JPY/USD and barrier at 120.00 JPY/USD. The current JPY/USD rate is at 119.50. The risk manager needs to decide on which Value-at-Risk (VaR) method will capture the risk of the portfolio most accurately. Which one of the following methods is the most appropriate?

a. The delta-normal method
b. The delta-gamma-vega method
c. Monte Carlo Simulation
d. The historical simulation method using vanilla JPY/USD option price time series

27. Which of the following best describes what we would normally expect to see in a seasonal agricultural market like wheat? Assume "the harvest" is normal and not unusually big or unusually small. Now consider the following statements about the market.

I. Prices fall at the harvest and rise after the harvest.
II. Prices are constant on average across the year regardless of seasonality.
III. Prices rise at the harvest and fall afterwards.
IV. The market is in contango when the harvest comes in.
V. The market is in backwardation when the harvest comes in.
VI. If the market goes into contango, it is most likely to do so right before a new harvest.
VII. If the market goes into backwardation, it is most likely to do so right before a new harvest.

Now choose the letter that best describes which of the above statements is **true.**

a. I and IV are the only true statements
b. I, IV, and VI are the only true statements
c. III, V, and VII are the only true statements
d. I, IV, and VII are the only true statements

28. RS International Financial Services has £8 bln in foreign exchange exposure and total assets of £100 bln and has opted to use the Advanced Measurement Approach in calculating its capital requirements starting in 2007. The CRO has decided to explore the use of insurance products to transfer some of its operational risk exposures in order to obtain some relief form its capital charge. Which of the following conditions will nullify the company's ability to use insurance to provide capital relief?

I. The insurance company has a claims paying rating of AA or its equivalent
II. The insurance company is owned 10% by RS International Financial Services
III. The insurance policy does not contain any exclusions or limitations related to any supervisory actions
IV. The insurance policy contains a minimum notice of cancellation of at least 90 days.

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

29. Given the 1 year transition matrix below, what is the probability that a company that is currently B rated will default over a given two year period?

Initial Period State	**Next Period State**		
	A	**B**	**Default**
A	85%	10%	5%
B	10%	80%	10%

a. 10.0%
b. 18.0%
c. 18.5%
d. 20.0%

30. You are evaluating USD based bond investments issued by the 4 companies below. According to your investment guidelines, you may only invest in companies that have an investment grade rating from two recognized credit agencies and are located in a country with favorable sovereign risk quality (i.e., countries in which common sovereign risk probability models indicate a low probability of debt rescheduling). Assuming the company is located in the paired country, which (country, company) pair would be the most appropriate investment?

Country	Import Ratio	Debt Service Ratio	Company	S&P Rating	Moody's Rating
Eurasia	35%	323%	Big Ben Financial	BBB	Ba
Atlantis	6%	267%	Pyramid Bank Holdings	BBB	Baa
Neptune	8%	29%	Maple Leaf Investments	BB	Baa
Wally World	41%	34%	Cappuccino Capital	A	Ba

a. (Atlantis, Cappuccino Capital)
b. (Neptune, Pyramid Bank Holdings)
c. (Wally World, Big Ben Financial)
d. (Eurasia, Maple Leaf Holdings)

31. Wallace, an emerging market bond trader, is holding a USD 5 year Malaysian corporate bond in his book. He has made enough profit from this bond position and wishes to lock in the profit (full hedge) without selling it. Which is the best option for Wallace below?

a. Buy protection with a USD 5 year Malaysian bond.
b. Buy protection with a USD credit default swap on the Malaysian corporate bond.
c. Buy protection with a USD 5 year US Treasury government bond and short a USD credit default swap on the Malaysian corporate bond.
d. Buy protection with a USD 5 year Ringgit Malaysia government bond and USD short a credit default swap on the Malaysian corporate bond.

32. Which of the following is **not** a determinant of asset liquidation costs?

a. The liquidation time horizon
b. Asset fungibility
c. Asset type
d. Asset size

33. The standalone economic capital requirements for insurance companies can be broken down into three major risk factors: Credit Risk, Market/ALM Risk and operating and other risks. Analyzing the risk profiles of a life insurer, a P&C insurer and a diversified insurer the highest market/ALM risk would be for

a. Life Insurer
b. P&C insurer
c. Diversified insurer
d. Property insurer

34. As the inexperienced global head of operational risk for DEF Financial Services, you are trying to make a decision about how to quantify your firm's operational risk exposure. You've decided the best combination of methodologies to use would be factor-based models and the capital asset pricing model. Now, six months after you've implemented your approach you've identified some major limitations in your decision on the methodologies to use. Which of the following best describes those limitations?

I. You are unable to reliably predict an operational risk event on a detailed level.
II. Collecting and aggregating consistent data across the firm is challenging.
III. You are unable to capture interdependencies between areas of your firm.
IV. You are unable to reliably forecast general trends in operational risk events.

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

35. A portfolio has an average return over the last year of 13.2%. Its benchmark has provided an average return over the same period of 12.3%. The portfolio's standard deviation is 15.3%, its beta is 1.15, its tracking error volatility is 6.5% and its semi-standard deviation is 9.4%. Lastly the risk free rate is 4.5%. Calculate the portfolio's Information Ratio (IR).

a. 0.569
b. 0.076
c. 0.138
d. 0.096

36. Steve, a market risk manager at Marcat Securities, is analyzing the risk of the S&P500 Index options trading desk. His risk report shows the desk is net long gamma and short vega. Which of the following portfolios of options show exposures consistent with this report?

a. The desk has substantial long expiry long Call positions and substantial short expiry short Put positions.
b. The desk has substantial long expiry long Put positions and substantial long expiry short Call positions.
c. The desk has substantial long expiry long Call positions and substantial short expiry short Call positions.
d. The desk has substantial short expiry long Call positions and substantial long expiry short Call positions.

37. You are given the following information about a portfolio and are asked to make a recommendation about how to reallocate the portfolio to improve the risk/return tradeoff.

Asset	Expected Return	Standard Deviation	Current Weight	Covariance of portfolio and asset returns	Marginal Return	Marginal Risk	Marginal Return/ Marginal Risk	Risk Contribution
Asset 1	7.10%	17.00%	38.70%	1.43%	3.10%	13.99%	22.17%	5.41%
Asset 2	8.00%	40.60%	6.20%	2.44%	4.00%	23.93%	16.71%	1.48%
Asset 3	6.70%	44.80%	5.50%	2.39%	2.70%	23.39%	11.55%	1.29%
Asset 4	6.90%	21.40%	14.60%	1.41%	2.90%	13.86%	20.92%	2.02%
Risk Free	4.00%	0.00%	35.00%	0.00%				

Which of the following the recommendations will improve the risk/return tradeoff of the portfolio?

a. Increase the allocations to assets 1 and 3 and decrease the allocations to assets 2 and 4.
b. Increase the allocations to assets 1 and 2 and decrease the allocations to assets 3 and 4.
c. Increase the allocations to assets 2 and 3 and decrease the allocations to assets 1 and 4.
d. Increase the allocations to assets 1 and 4 and decrease the allocations to assets 2 and 3.

38. Which of the following statements is the least accurate about the foundation IRB and the advanced IRB approaches for credit risk capital charge in the Basel II?

a. Under the advanced IRB approach, banks are allowed to use their own estimates of PD, LGD, EAD, and correlation coefficient, within the risk-weight functions provided by the supervisors.
b. Under the foundation IRB approach, banks provide their own estimates of PD and rely on supervisory estimates for other risk components.
c. Banks adopting the advanced IRB approach are expected to continue to employ this approach. A voluntary return to the standardized approach is permitted
d. Under both foundation IRB and advanced IRB approaches, the expected loss is not included in the credit risk capital charge.

39. The risk of the occurrence of a significant difference between the mark-to-model value of a complex and/or illiquid instrument, and the price at which the same instrument is revealed to have traded in the market is referred to as:

a. Dynamic Risk
b. Liquidity Risk
c. Mark-to-Market Risk
d. Model Risk

40. Let X be a uniformly distributed random variable between minus one and one so that the standard deviation of X is 0.577. What percentage of the distributions will be less than 1.96 standard deviations above the mean:

a. 100%
b. 97.5%
c. 95%
d. Insufficient information provided.

2008 FRM PRACTICE EXAM III: CORRECT CANDIDATE ANSWER SHEET

	a.	b.	c.	d.
1.	○	●	○	○
2.	○	●	○	○
3.	○	●	○	○
4.	○	●	○	○
5.	●	○	○	○
6.	○	○	●	○
7.	○	●	○	○
8.	●	○	○	○
9.	○	○	○	●
10.	○	●	○	○
11.	○	○	○	●
12.	○	○	○	●
13.	●	○	○	○
14.	○	○	●	○
15.	○	○	○	●
16.	●	○	○	○
17.	○	○	●	○
18.	○	○	●	○
19.	○	○	○	●
20.	○	●	○	○
21.	●	○	○	○
22.	○	○	●	○

	a.	b.	c.	d.
23.	●	○	○	○
24.	○	○	○	●
25.	○	●	○	○
26.	○	○	●	○
27.	○	○	○	●
28.	○	○	●	○
29.	○	○	●	○
30.	○	●	○	○
31.	○	○	●	○
32.	○	○	○	●
33.	●	○	○	○
34.	○	○	●	○
35.	○	○	●	○
36.	○	○	○	●
37.	○	○	○	●
38.	●	○	○	○
39.	○	○	○	●
40.	●	○	○	○

Correct way to complete
1. ● ● ● ●

Wrong way to complete
1. ⊘ ⊖ ✓ ✘

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2008 FRM PRACTICE EXAM III: ANSWERS AND EXPLANATIONS

1. Gamma Industries, Inc. issues an inverse floater with a face value of USD 50,000,000 that pays a semiannual coupon of 11.50% minus LIBOR. Gamma Industries intends to execute an arbitrage strategy and earn a profit by selling the notes, using the proceeds to purchase a bond with a fixed semiannual coupon rate of 6.75% a year, and hedging the risk by entering into an appropriate swap. Gamma Industries receives a quote from a swap dealer with a fixed rate of 5.75% and a floating rate of LIBOR. What would be the most appropriate type of swap Gamma Industries, Inc. should enter into to hedge their risk?

a. Pay-fixed, receive-fixed
b. Pay-floating, receive-fixed swap
c. Pay-fix, receive-floating
d. The risk cannot be hedged with a swap

Answer: b

a. Incorrect. The company has a floating outflow of (11.50% – LIBOR) and a fixed inflow of (6.75%)(USD 50,000,000). The swap suggested has two fixed legs which is not an appropriate structure for an interest rate swap which should have a fixed leg and a variable leg.
b. Correct. The company has a floating outflow of (11.50% – LIBOR) and a fixed inflow of (6.75%)(USD 50,000,000). On the outflow, -LIBOR is the same as an inflow Pay-floating, Receive-fix. Gamma Industries is exposed to interest rate fluctuations of LIBOR. Therefore, the appropriate swap would be a pay-floating, receive-fixed swap.
c. Incorrect. The company has a floating outflow of (11.50% – LIBOR) and a fixed inflow of (6.75%) (USD 50,000,000). On the outflow, -LIBOR is the same as an inflow Pay-floating, Receive-fix. Gamma Industries is exposed to interest rate fluctuations of LIBOR. Therefore, the appropriate swap should pay-floating (not fix) and receive fixed (not floating).
d. Incorrect. This risk can indeed be hedged by entering into a swap as the company has both fixed and variable rate cash flows arising from the arbitrage transaction described.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 7 – Swaps

2. An American investor holds a portfolio of French stocks. The market value of the portfolio is €10 million, with a beta of 1.35 relative to the CAC index. In November, the spot value of the CAC index is 4,750. The exchange rate is USD 1.25/€. The dividend yield, euro interest rates, and dollar interest rates are all equal to 4%. Which of the following option strategies would be most appropriate to protect the portfolio against a decline of the euro that week?

March Euro options (all prices in US dollars per €)

Strike	Call euro	Put euro
1.25	0.018	0.022

a. Buy calls with a premium of USD 180,000
b. Buy puts with a premium of USD 220,000
c. Sell calls with a premium of USD 180,000
d. Sell puts with a premium of USD 220,000

Answer: b

a. Incorrect. This would not protect against a decline in the euro and would rather provide upside in case of appreciation of the euro.
b. Correct. This would protect against a decline in the euro and the premium would be USD.022 x €10 million = USD220,000.
c. Incorrect. This would not protect against a decline in the euro and would rather make the Investor subject to (theoretically) unlimited losses (writing naked calls); the amount of premium is also incorrect and should be USD.018 x €10 million = USD180,000.
d. Incorrect. This would not protect against a decline in the euro and would rather protect against a decline in the US dollar; the amount of premium is also incorrect and should be USD .022 x €10 million = USD 220,000.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 9 – Properties of Stock Options

3. Which statement best describes correlations and variances in times of financial crisis?

a. There are only marginal changes in correlations and variances in times of crisis and therefore they do not need to be factored into risk management.
b. The diversification benefits decrease as correlations increase and therefore your risk level increases.
c. The diversification benefits increase as correlations decrease and therefore your risk level decreases.
d. VaR estimates using the Riskmetrics approach provide for the effects of increased correlations during periods of crisis and therefore the effects are factored into current positions.

Answer: b

a. Incorrect. Because during crisis situations the correlation between global markets increases as suggested by empirical evidence.
b. Correct. During crisis situations the correlation between global markets increases as suggested by empirical evidence. The implication of this increased correlation is that the maximum amount to be lost for a given probability over a given time period increases. Therefore, diversification benefits decrease when correlations rise and therefore the risk level increases.
c. Incorrect. During crisis situations the correlation between global markets increases as suggested by empirical evidence. The implication of this increased correlation is that the maximum amount to be lost for a given probability over a given time period increases. Therefore, diversification benefits decrease when correlations rise and therefore the risk level increases (and not decreases).
d. Incorrect. VAR estimates do not provide for the effects of increased correlations during periods of crisis. Stress testing can be used to evaluate the effects of increased correlations.

Reference:
Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 1 – Introduction to Value at Risk (VaR)

Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 3 – Putting VaR to Work

4. Which of the following risks is not included in the Basel II definition of operational risk?

a. Legal Risk.
b. Reputation Risk.
c. Process Failure Risk.
d. Systems Failure Risk.

Answer: b

a. Incorrect. It is an Operational Risk as per Basel II accord.
b. Correct. It is not an Operational Risk as per Basel II accord.
c. Incorrect. Iit is an Operational Risk as per Basel II accord.
d. Incorrect. It is a Operational Risk as per Basel II accord.

Reference:
Basel Committee on Banking Supervision. " Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for International Settlements, November 2005, para 644.

5. An analyst observes that the market price of a call option is USD 5 higher than the theoretical price dictated by an option pricing model. Assuming the same strike price and time to expiration, what should be the relationship between the market price of a put option and its theoretical price dictated by the option pricing model?

a. The market price will be higher than the theoretical price by USD 5.
b. The market price will be higher than the theoretical price by an amount lower than USD 5.
c. The market price will be lower than the theoretical price by USD 5.
d. The market price will be lower than the theoretical price by an amount lower than USD 5.

Answer: a

a. Correct. Given the same strike price and time to expiration, option market prices that deviate from those dictated by the Black-Scholes model are going to deviate in the same amount whether they are for calls or puts.
b. Incorrect. The deviation will be for the same amount, not a lower amount. Given the same strike price and time to expiration, option market prices that deviate from those dictated by the Black-Scholes model are going to deviate in the same amount whether they are for calls or puts.
c. Incorrect. The market price will be higher, not lower than the theoretical price. Given the same strike price and time to expiration, option market prices that deviate from those dictated by the Black-Scholes model are going to deviate in the same amount whether they are for calls or puts.
d. Incorrect. The market price will be higher, not lower than the theoretical price. Given the same strike price and time to expiration, option market prices that deviate from those dictated by the Black-Scholes model are going to deviate in the same amount whether they are for calls or puts.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 16 – Volatility Smiles

6. Which type of option produces discontinuous payoff profiles, meaning that the payoff does not increase or decrease continuously with the underlying asset value?

a. Chooser options.
b. Barrier options.
c. Binary options.
d. Lookback options.

Answer: c

a. Incorrect. The payoff profile of a chooser option is continuous.
b. Incorrect. The payoff profile of a barrier option is continuous.
c. Correct. The binary option is the only one that produces discontinuous payoff profiles because it pays one price at the expiration if the asset value is above the strike price and nothing if the asset price is below the strike price.
d. Incorrect. The payoff profile of a lookback option is continuous.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 22 – Exotic Options

7. Which of the following GARCH models will take the shortest time to revert to its mean?

a. $h_t = 0.05 + 0.03r^2_{t-1} + 0.96h_{t-1}$
b. $h_t = 0.03 + 0.02r^2_{t-1} + 0.95h_{t-1}$
c. $h_t = 0.02 + 0.01r^2_{t-1} + 0.97h_{t-1}$
d. $h_t = 0.01 + 0.01r^2_{t-1} + 0.98h_{t-1}$

Answer: b

a. Incorrect. The model that will take the shortest time to revert to its mean is the model with the lowest persistence defined by $\alpha_1 + \beta$. In this case the persistence factor is the second largest: $\alpha_1 + \beta = 0.03 + 0.96 = 0.99$.
b. Correct. The model that will take the shortest time to revert to its mean is the model with the lowest persistence defined by $\alpha_1 + \beta$. In this case the persistence factor is the second lowest: $\alpha_1 + \beta = 0.02 + 0.95 = 0.97$.
c. Incorrect. The model that will take the shortest time to revert to its mean is the model with the lowest persistence defined by $\alpha_1 + \beta$. In this case the persistence factor is the largest: $\alpha_1 + \beta = 0.01 + 0.97 = 0.98$.
d. Incorrect. The model that will take the shortest time to revert to its mean is the model with the lowest persistence defined by $\alpha_1 + \beta$. In this case the persistence factor is the lowest: $\alpha_1 + \beta = 0.01 + 0.98 = 0.99$.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 8

8. Which of the following mortgage backed securities has a negative duration?

a. Interest-Only strips (IO).
b. Inverse floater.
c. Mortgage pass-through.
d. Principal-Only strips (PO).

Answer: a

a. Correct. If interest rates fall, IO strips will decrease in value, the other 3 securities will increase in value.
b. Incorrect. If interest rates fall, IO strips will decrease in value, the other 3 securities will increase in value.
c. Incorrect. If interest rates fall, IO strips will decrease in value, the other 3 securities will increase in value.
d. Incorrect. If interest rates fall, IO strips will decrease in value, the other 3 securities will increase in value.

If interest rates fall, mortgage prepayments will accelerate. PO investors will receive their payments earlier than anticipated. Therefore PO strips will increase in value.

If interest rates fall, IO strips will decrease in value. This is due to increased mortgage prepayments will cause the outstanding principal to shrink, that means a decrease in the interest payments.

Reference:
Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002).
Chapter 21 'Mortgage-Backed Securities'

9. Suppose the risk-adjusted return on capital (RAROC) for a project is 14 percent, the risk-free rate is 4 percent, the market return is 13 percent and the firm's equity beta is 1.2. Using adjusted (or second generation) RAROC, the project should

a. Be accepted and the adjusted RAROC is 10%.
b. Be accepted and the adjusted RAROC is 8.33%.
c. Not be accepted and the adjusted RAROC is 10%.
d. Not be accepted and the adjusted RAROC is 8.33%.

Answer: d

Adjusted RAROC = (14% - 4%) / 1.2 = 8.33%.
Excess return on the market = 13% - 4% = 9%.
Since adjusted RAROC of 8.33% is less than excess return on the market, the project should not be accepted.

a to c: Incorrect answers based on the correct answer above.

Reference:
Michael Crouhy, Dan Galai, and Robert Mark, Risk Management (New York: McGraw-Hill, 2001)., Chapter 14 – Capital Allocation and Performance Measurement

10. You are given the following information about an interest rate swap:

- 2-year Term
- Semi-annual payment
- Fixed Rate = 6 %
- Floating Rate = LIBOR + 50 basis points.
- Notional principal USD10 million.

Calculate the net coupon exchange for the first period if LIBOR is 5% at the beginning of the period and 5.5% at the end of the period.

a. Fixed rate payer pays USD 0.
b. Fixed rate payer pays USD 25,000.
c. Fixed rate payer pays USD 50,000.
d. Fixed rate payer receives USD 25,000.

Answer: b

a. Incorrect. The candidate incorrectly uses the LIBOR rate at the end of the period.
b. Correct. Fixed rate payer pays USD25,000. See BELOW for details.
c. Incorrect. The candidate forgets to add the 50 basis points to the beginning LIBOR rate.
d. Incorrect. The candidate is confused about the cash flow direction. A net positive payment is paid by the fixed rate payer, not receiving.

Computational Details for Numerical Answer:
- Fixed rate payer pays 6%, therefore (0.06 / 2) x 10 million = USD 300,000.
- Interest rate swaps have payments in arrears. Floating rate payer pays LIBOR rate at the beginning of period + 0.50%, i.e. 5 % + 0.50% = 5.5 %.
  Therefore the floating rate payment = (0.055 / 2) x 10 million = USD 275,000.
- The net payment of USD 25,000 is paid by the fixed rate payer.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 7 – Swaps

11. Which of the following statements is false?

a. European-styled call and put options are most affected by changes in vega when they are at-the-money.
b. The delta of a European-styled put option on an underlying stock would move towards zero as the price of the underlying stock rises.
c. The gamma of an at-the-money European-styled option tends to increase as the remaining maturity of the option decreases.
d. Compared to an at-the-money European-styled call option, an out-of-the money European option with the same strike price and remaining maturity would have a greater negative value for theta.

Answer: d

a. Correct. Vega is highest for at-the-money options.
b. Correct. The delta for a European put option is negative, and the likelihood of exercise decreases, i.e., delta moves towards zero, as the price of the underlying stock increases.
c. Correct. Gamma increases as the time to maturity decreases. As time to maturity approaches zero, gamma approaches infinity.
d. Incorrect. Theta is large and negative for an at–the-money European-styled option, whilst theta is close to zero when the price for the underlying stock is very low. Therefore the theta for an out-of-the–money European styled call option would have a lower negative value compared to that of an at-the-money European-styled call option.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 15 – The Greek Letters

12. The returns of the stocks over the last year in a large portfolio follow a distribution that is approximately normal. An unethical analyst removes some of the very worst performing stocks and produces reports based on the altered portfolio returns. Which of the following statements about the returns of the altered portfolio is/are correct?

I. The distribution of returns of the altered portfolio is likely to be positively skewed
II. The distribution of returns of the altered portfolio is likely to be negatively skewed
III. The mean return is likely to be lower compared to the original portfolio
IV. The median return is likely to be higher compared to the original portfolio

a. I only is correct
b. II and III are correct
c. II and IV are correct
d. I and IV are correct

Answer: d

The distribution of returns is likely to be positively skewed, since the extreme values on the extreme left side of the distribution have been removed, therefore

a. I is correct
b. II is incorrect.
c. Removing some of the lowest values will increase the mean and median, so III is incorrect
d. IV is correct.

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 3 – Mathematical Expectation

13. Assume Satya Bank, having a capital of USD 500 million, wants to limit its losses in the energy sector to 6% and in the construction sector to 4.5% of its capital. The LGD rates for the energy and construction sectors are, respectively, 45% and 70%. If Satya Bank wants to strictly adhere to its concentration limit policy, the maximum permitted loan amount to the energy and construction sectors will be:

	Energy	Construction
a.	USD 66.7 million	USD 32.1 million
b.	USD 13.5 million	USD 15.8 million
c.	USD 37.5 million	USD77.8 million
d.	USD 30.0 million	USD 22.5 million

Answer: a

a. Correct.
Concentration Limit = Capital x (loss limit on capital / loss rate of the sector)
Concentration Limit for Energy = USD 500 million x (0.06 / 0.45) = USD 66,666,667
Concentration Limit for Constr. = USD 500 million x (0.045 / 0.70) = USD 32,142,857

b. Incorrect. It uses incorrect variables and/or formula to calculate concentration limits.

c. Incorrect. It uses incorrect variables and/or formula to calculate concentration limits.

d. Incorrect. It uses incorrect variables and/or formula to calculate concentration limits.

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 12 – Credit Risk: Loan Portfolio and Concentration Risk

14. Exporters are affected in different ways due to movement in foreign currency value with the base of domestic currency. Which of the following situations provides the maximum benefit to an Exporter?

a. Exporter of goods with elastic demand as the value of foreign currency rises.
b. Exporter of goods with inelastic demand as the value of foreign currency falls.
c. Exporter of goods with inelastic demand as the value of foreign currency rises.
d. Exporter of goods with elastic demand as the value of foreign currency falls.

Answer: c

a. Incorrect. Exporters will gain on payment for existing foreign currency dues in terms of domestic currency. However, as demand of the goods is elastic, Importers in foreign country may find another buyer or a substitute of it domestically. Hence, in quantity terms, the sales may decline over the period or else price may need to be reduced to maintain quantity sale. Hence, maximization of gain may not be achieved.
b. Incorrect. With foreign currency value falling, Exporter will be in a loss as they will be able to realize less in terms of domestic currency.
c. Correct. Maximum gain can be achieved when there is favorable situation on both the sides. Price Realization and Quantity. Rising foreign currency value will make the export realization more profitable in terms of domestic currency. An in-elastic demand is favorable to the exporter / seller in terms of quantity sale, as Price need not be reduced significantly.
d. Incorrect. Falling currency value will reduce the Price Realization to Exporter.

Reference:
René Stulz, Risk Management & Derivatives (Mason, Ohio: South-Western, 2003)., Chapter 8 – Identifying and Managing Cash Flow Exposures

15. Which of the following statements about the Sortino ratio are valid?

I. The Sortino ratio is more appropriate for asymmetrical return distributions.
II. The Sortino ratio compares the portfolio return to the return of a benchmark portfolio.
III. The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses variance as a risk metric.
IV. The Sortino ratio is defined on the same principles as the Sharpe ratio, but the Sortino ratio replaces the risk free rate with the minimum acceptable return and the standard deviation of returns with the standard deviation of returns below the minimum acceptable return.

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

Answer: d

a. Incorrect. II – The information ratio, not the Sortino ratio, compares the portfolio return to the return of a benchmark portfolio. III – The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses semi-variance, not variance, as a risk metric.
b. Incorrect. III – The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses semi-variance, not variance, as a risk metric.
c. Incorrect. III – The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses semi-variance, not variance, as a risk metric.
d. Correct. I – Since the Sortino ratio uses the notion of semi-variance, it is more appropriate for asymmetric return distributions than any metric that uses standard deviation (such as the Sharpe ratio). IV – The Sortino ratio is similar to the Sharpe ratio, except the risk free rate is replaced with the minimum acceptable return in the numerator and the standard deviation of the returns is replaced with the standard deviation of the returns below the minimum acceptable return in the denominator. II – The information ratio, not the Sortino ratio, compares the portfolio return to the return of a benchmark portfolio. III – The Sortino ratio allows one to evaluate portfolios obtained through an optimization algorithm that uses semi-variance, not variance, as a risk metric.

Reference:
Noel Amenc and Veronique Le Sourd, Portfolio Theory and Performance Analysis (West Sussex: Wiley, 2003)., Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

16. A zero-coupon bond with a maturity of 10 years has an annual effective yield of 10%. What is the closest value for its modified duration?

a. 9
b. 10
c. 100
d. Insufficient Information

Answer: a

You must first recall that the Macauley duration of a zero-coupon bond is equal to its maturity. Then, the modified duration of a zero-coupon bond is: Macauley duration / 1+ i = 10 / 1.10 = 9.09.

a. Correct. The above formula was used correctly, D^{mod} = Macauley duration / 1+ i.
b. Incorrect. It corresponds to the Macauley duration, not the Modified duration.
c. Incorrect. The denominator used in the formula was i instead of 1+i.
d. Incorrect. All the necessary information is in there.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 6 – Interest Rate Futures

17. Which of the following is not a methodology allowed by Basel II committee for measuring Credit Risk?

a. Measure credit risk in a standardized manner, supported by external credit assessments.
b. A methodology, which is subject to the explicit approval of the banks. A supervisor would allow banks to use their internal rating systems for credit risk.
c. Use external ratings for certain assets and use internal ratings for the rest of the assets.
d. None of the above.

Answer: c

a. Incorrect. As it is a method allowed by Basel II for measuring Credit Risk.
b. Incorrect. As it is a method allowed by Basel II for measuring Credit Risk.
c. Correct. As Basel II committee does not allow cherry picking.
d. Incorrect. As C is correct.

Reference:
Basel Committee on Banking Supervision. " Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for International Settlements, November 2005. Page 27, para 50, 51.

18. You are being interviewed for the position of CRO for a large fund-of-funds. You are asked to comment on the risk management approach of the CRO you would replace, James Smith, and who just left to start his own fund-of-funds. To evaluate the risk of a hedge fund that invests in U.S. equities over the coming month, Smith proceeded as follows. Using monthly data, he would regress, using ordinary least-squares, the return of the fund over its history on the return of the S&P 500, the return of a portfolio long growth stocks and short value stocks, and the return of a portfolio long large firms and short small firms. He would then use an EWMA model to forecast volatilities and correlations for the risk factors. Using the exposures of the fund to the risk factors and the standard deviation of the residual of the regression, he would then forecast the volatility of the fund and use the parametric approach assuming normally distributed returns to estimate the one-month VaR of the fund. Which of the following statements are correct?

I. The well-known work of Fama and French tells us that Smith uses an appropriate risk model, so that the risk factors do not need to be changed. However, his approach makes the mistake of ignoring the fact that hedge fund returns are not normally distributed. The correct distribution of the residual should have higher kurtosis than the normal distribution.
II. The estimates of the exposures to the risk factors will often be biased since the returns of many hedge funds exhibit high serial correlation compared to the returns of mutual funds.
III. The model used by Smith will have low explanatory power because hedge funds change exposures to the risk factors he uses often, but the explanatory power could be improved by using additional asset based factors that have been developed in the literature.
IV. Since portfolio holdings for the typical hedge fund change so much, it is hopeless to hope to explain more than a trivial faction of the return of a typical hedge fund using a factor model.

a. Statements I and II are correct.
b. Only statement I is correct.
c. Statements II and III are the only correct statements.
d. Statement IV is the only correct statement.

Answer: c

a. Incorrect. The risk model used is not one that captures the nonlinear exposures of hedge funds.
b. Correct. Smoothing of fund returns means that this month's return reflects only part of the impact of the risk factor returns of this month.
c. Correct. Asset-based factor models perform reasonably well when they use factors designed to capture the non-linear exposures of hedge funds.
d. Incorrect. 'c' is correct.

Reference:
William Fung and David Hsieh, "The Risk in Fixed-Income Hedge Fund Strategies", Journal of Fixed Income 12, 6-27 (2002)

19. Banks which need to qualify for the IRB approach need to fulfill certain minimum requirements. One of these is "Corporate Governance and Oversight". Under this, credit risk control is an important component. Which of the following is not an area of responsibility of credit risk control function?

a. Testing and monitoring internal grades.
b. Implementing procedures to verify that rating definitions are consistently applied across departments and geographic areas.
c. Reviewing and documenting any changes to the rating process, including the reasons for the changes.
d. Origination of various types of credit exposures.

Answer: d

a. Incorrect. It is an area of responsibility of Credit Risk Control function.
b. Incorrect. It is an area of responsibility of Credit Risk Control function.
c. Incorrect. It is an area of responsibility of Credit Risk Control function.
d. Correct. It is not an area of responsibility of Credit Risk Control function.

Reference:
Basel Committee on Banking Supervision. "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework." Basel: Bank for International Settlements, November 2005, para 441.

20. Two comparable (same credit rating, maturity, liquidity, rate) U.S. callable corporate bonds are being analyzed by you. The following data is available for the nominal spread over the U.S. Treasury yield curve and Z spread and option adjusted spread relative to the U.S. Treasury spot curve

	X	Y
Nominal spread	145	130
Z spread	120	115
OAS	100	105

The nominal spread on the comparable option free bonds in the market is 100 basis points. Which of the following statements is correct?

a. X is undervalued.
b. Y is undervalued.
c. X and Y both are undervalued.
d. Neither X nor Y is undervalued.

Answer: b

a. Incorrect. The OAS of X bond is equal to the comparable option free bond while the option cost is also higher than the Y bond.
b. Correct. The OAS of the bonds should be compared with the nominal spread on comparable option free bonds. Bonds with higher OAS and low option cost are undervalued and should be bought.
c. Incorrect. X is not undervalued with a comparable OAS to the nominal spread of the option free bonds.
d. Incorrect. Y is undervalued and should be bought.

Reference:
Bruce Tuckman, Fixed Income Securities, 2nd ed. (Hoboken: John Wiley & Sons, Inc., 2002)., Chapter 21 – Mortgage-Backed Securities

21. Which one of the following statements on hedging exotic options is incorrect?

a. Asian options are more difficult to hedge because they have more extreme gamma towards expiration.
b. Barrier options are more difficult to hedge because delta is liable to be discontinuous at the barrier.
c. The approach of static options replication is to find a portfolio of regular options whose value matches the value of the exotic option on some boundary.
d. The portfolio constructed using static option replication must be unwound when any part of the boundary is reached.

Answer: a

a. Incorrect. Asian options are easier to hedge because the payoff becomes progressively more certain as we approach maturity.
b. Correct. Barrier options are more difficult to hedge because delta is liable to be discontinuous at the barrier.
c. Correct. The approach of static options replication is to find a portfolio of regular options whose value matches the value of the exotic option on some boundary.
d. Correct. The portfolio constructed using static option replication must be unwound when any part of the boundary is reached.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 22 – Exotic Options

22. Which of the following is not considered an event of default on the reference asset underlying a CDS with the 2003 ISDA documentation?

a. Bankruptcy
b. Restructuring
c. Rating agency downgrade
d Obligation acceleration

Answer: c

Explanation: A CDS will not protect you against migration or downgrade risk

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 2 – Credit Derivatives Products

23. A factor analysis of the dividend-adjusted returns of ABC Ltd.'s stock price was undertaken to determine which economic factors contributed to its performance. The regression was performed on 460 observations. The results are as follows:

Table 1:

Predictor	Coefficient	Standard Error of Coefficient
Intercept	-.0243	0.005772
All_share_index	.0256	0.017655
Industrial_index	.0469	0.006398
Financial_index	.0012	0.001412

Table 2:

Sum of Squared Regression (SSR)	12,466.47
Sum of Squared Errors (SSE)	1,013.22
Sum of Squared Total (SST)	13,479.69

Which one of the following options correctly describes which variables are significant at the 5% level, and the R2 statistic, respectively?

	Significant Variables at 5% level	R^2 statistic
a.	Intercept; Industrial_index	0.924834
b.	Intercept; Industrial_index	0.075166
c.	All_share_index; Industrial_Index	0.924834
d.	All_share_index; Industrial_Index	0.075166

Answer: a

The following table shows the test statistics for each of the four variables, calculated by dividing the variable coefficient by the standard error. The variable is significant if the absolute value of the t-stat is greater than the critical value from the student's t-distribution for 456 degrees of freedom (which is very close to the z-statistic since the number of observations is so high), i.e. 1.96.

Predictor	t-stat	Significant?
Intercept	-.0243/0.005772 = -4.21	Yes
All_share_index	.0256/0.017655 = 1.45	No
Industrial_index	.0469/0.006398 = 7.33	Yes
Financial_index	.0012/0.001412 = 0.85	No

The R^2 statistic is defined as the ratio of SSR/SST = 12,466.47/13,479.69 = 0.924834.

Reference:

Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 8 – Curve Fitting, Regression, and Correlation

24. Which of the following is not a distinction between cash and synthetic CDOs?

a. The assets are actually sold to the SPV in a cash CDO but are not in a synthetic CDO.
b. The cash CDO provides exposure to actual assets, whereas a synthetic CDO provides a similar economic exposure through credit derivatives
c. Cash raised from the issuance of securities is used to finance the purchase of the assets in a cash CDO and to collateralize the CDS in a synthetic CDO.
d. Cash CDOs can have at most one layer of subordination, whereas synthetic CDOs can issue many subordinated tranches of securities.

Answer: d

Explanation: Both cash and synthetic CDOs can have any number of layers of subordination

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 3 – Synthetic Structures

25. Which of the following is not a commonly used method for generating a recovery rate function?

a. Nonparametric kernel estimation.
b. Cubic SPLINE estimation.
c. Assume the recovery rate follows a beta distribution.
d. Estimate conditional densities with generalized method of moments.

Answer: b

Explanation: Cubic SPLINE estimation would make little sense here.

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 4 – Loss Given Default

26. A market risk manager is monitoring a trader's portfolio which is currently solely long in a series of identical knock-out call options on JPY/USD. These are up-and-out European-style options that will expire in 1 month's time. The strike is at 110.00 JPY/USD and barrier at 120.00 JPY/USD. The current JPY/USD rate is at 119.50. The risk manager needs to decide on which Value-at-Risk (VaR) method will capture the risk of the portfolio most accurately. Which one of the following methods is the most appropriate?

a. The delta-normal method
b. The delta-gamma-vega method
c. Monte Carlo Simulation
d. The historical simulation method using vanilla JPY/USD option price time series

Answer: c

a. Incorrect. The options are very close to being knocked out and the change in the greeks like delta will be dramatically change (Delta will jump straight to zero once barrier is hit). This significant non-linearity in these types of barrier options makes the delta-normal method inappropriate.
b. Incorrect. The same reason in (a) applies.
c. Correct. The Monte Carlo Simulation is a full revaluation VaR method that takes into account the significant non-linearity in barrier options. For example, if one of the simulated scenarios indicates a JPY/USD level of 120.10, the options would have been knocked out and the MTM of the options will be zero.
d. Incorrect. The vanilla JPY/USD option time series does not take into account the significant non-linearity of barriers option.

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 22 – Exotic Options

27. Which of the following best describes what we would normally expect to see in a seasonal agricultural market like wheat? Assume "the harvest" is normal and not unusually big or unusually small. Now consider the following statements about the market.

I. Prices fall at the harvest and rise after the harvest.
II. Prices are constant on average across the year regardless of seasonality.
III. Prices rise at the harvest and fall afterwards.
IV. The market is in contango when the harvest comes in.
V. The market is in backwardation when the harvest comes in.
VI. If the market goes into contango, it is most likely to do so right before a new harvest.
VII. If the market goes into backwardation, it is most likely to do so right before a new harvest.

Now choose the letter that best describes which of the above statements is **true.**

a. I and IV are the only true statements
b. I, IV, and VI are the only true statements
c. III, V, and VII are the only true statements
d. I, IV, and VII are the only true statements

Answer: d

Explanation: The new harvest 'resets' the storage market. For a while, consumption and production occur directly from the new harvest, and prices are low. Prices begin to rise as storage begins to occur. As the next harvest approaches, inventory may get tight, sending the market into backwardation.

Reference:
Robert L. McDonald, Derivatives Markets, (Boston: Addison-Wesley, 2003)., Chapter 6 – Commodity Forwards and Futures

28. RS International Financial Services has £8 bln in foreign exchange exposure and total assets of £100 bln and has opted to use the Advanced Measurement Approach in calculating its capital requirements starting in 2007. The CRO has decided to explore the use of insurance products to transfer some of its operational risk exposures in order to obtain some relief form its capital charge. Which of the following conditions will nullify the company's ability to use insurance to provide capital relief?

I. The insurance company has a claims paying rating of AA or its equivalent
II. The insurance company is owned 10% by RS International Financial Services
III. The insurance policy does not contain any exclusions or limitations related to any supervisory actions
IV. The insurance policy contains a minimum notice of cancellation of at least 90 days.

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

Answer: c

I. This condition is correct.
II. The insurance must be through an unaffiliated third party, here 10% owned would be considered an affiliate party.
III. This condition is correct.
IV. This condition is correct.

Reference:
Basel Committee on Banking Supervision Publication, November 2006, Studies on credit risk concentration: an overview of the issues and a synopsis of the results from the Research Task Force project"

29. Given the 1 year transition matrix below, what is the probability that a company that is currently B rated will default over a given two year period?

Initial Period State	Next Period State		
	A	B	Default
A	85%	10%	5%
B	10%	80%	10%

a. 10.0%
b. 18.0%
c. 18.5%
d. 20.0%

Answer: c

Explanation: To answer this question the test taker must understand transition matrices. The easiest way to determine the answer would be to make this a square matrix including default in initial state. Then self multiplying the matrix to get the two year transition matrix. We can also manually do the calculation;

After year 1 there is a 10% chance of default and 80% chance of still being B and a 10% Chance of being an A. In year 2 there is a 10% chance of default if I was B rated (or 80% * 10% = 8%) and a 5% chance of default if I was A rated (10% * 5% = 0.5%). The total probability is therefore 18.5%.
Answer 'a' assumes just one year
Answer 'b' ignores the probability of default after becoming A rated.
Answer 'd' simply adds two 10% (inappropriately does the second year probability)

Reference:
Arnaud de Servigny and Olivier Renault, Measuring and Managing Credit Risk, (New York: McGraw-Hill, 2004)., Chapter 2 – External and Internal Ratings

30. You are evaluating USD based bond investments issued by the 4 companies below. According to your investment guidelines, you may only invest in companies that have an investment grade rating from two recognized credit agencies and are located in a country with favorable sovereign risk quality (i.e., countries in which common sovereign risk probability models indicate a low probability of debt rescheduling). Assuming the company is located in the paired country, which (country, company) pair would be the most appropriate investment?

Country	Import Ratio	Debt Service Ratio	Company	S&P Rating	Moody's Rating
Eurasia	35%	323%	Big Ben Financial	BBB	Ba
Atlantis	6%	267%	Pyramid Bank Holdings	BBB	Baa
Neptune	8%	29%	Maple Leaf Investments	BB	Baa
Wally World	41%	34%	Cappuccino Capital	A	Ba

a. (Atlantis, Cappuccino Capital)
b. (Neptune, Pyramid Bank Holdings)
c. (Wally World, Big Ben Financial)
d. (Eurasia, Maple Leaf Holdings)

Answer: b

Explanation: An investment grade bond has S&P rating BBB or above or Moody's ratings Baa or above. Also relates to the '6' B's rule, with 'a' being considered a 'b'. Any bonds having 6-B's is rated as investment grade.

The larger the ratio of imports to foreign exchange reserves the higher the probability of default resulting in a rescheduling of payments (Import ratio)

The larger the hard currency debt repayment is in relation to export revenues, the greater the probability of rescheduling debt (Debt service ratio)

Reference:
Anthony Saunders and Marcia Millon Cornett, Financial Institutions Management, 5th ed. (New York: McGraw-Hill, 2005)., Chapter 16 – Sovereign Risk

31. Wallace, an emerging market bond trader, is holding a USD 5 year Malaysian corporate bond in his book. He has made enough profit from this bond position and wishes to lock in the profit (full hedge) without selling it. Which is the best option for Wallace below?

a. Buy protection with a USD 5 year Malaysian bond.
b. Buy protection with a USD credit default swap on the Malaysian corporate bond.
c. Buy protection with a USD 5 year US Treasury government bond and short a USD credit default swap on the Malaysian corporate bond.
d. Buy protection with a USD 5 year Ringgit Malaysia government bond and USD short a credit default swap on the Malaysian corporate bond.

Answer: c

a. Incorrect. Shorting government bond only does not hedge the credit spread risk.
b. Incorrect. Shorting the CDS only hedges the credit spread risk. Not the systematic risk of the government yield movement.
c. Correct.
d. Incorrect. Local government bond is locally denominated, thus can not be use to hedge out currency risk.

Reference:
Gunter Meissner, Credit Derivatives, Application, Pricing and Risk Management, (Malden, MA: Blackwell Publishing, 2005)., Chapter 4 – Application of Credit Derivatives

32. Which of the following is **not** a determinant of asset liquidation costs?

a. The liquidation time horizon
b. Asset fungibility
c. Asset type
d. Asset size

Answer: d

Explanation: There is not necessarily any economic link between asset size and liquidation cost.

Reference:
Christopher L. Culp, The Risk Management Process: Business Strategy and Tactics (Hoboken: John Wiley & Sons, Inc, 2001)., Chapter 17 – Identifying, Measuring, and Monitoring Liquidity Risk

33. The standalone economic capital requirements for insurance companies can be broken down into three major risk factors: Credit Risk, Market/ALM Risk and operating and other risks. Analyzing the risk profiles of a life insurer, a P&C insurer and a diversified insurer the highest market/ALM risk would be for

a. Life Insurer
b. P&C insurer
c. Diversified insurer
d. Property insurer

Answer: a

a. Market/ALM risk accounts for 50% of the capital requirement of a life insurer,
b. 44% of the diversified insurer,
c. 37% of the P&C insurer
d. Obviously false, covered under b) P&C insurer

Typically the market risk is highest for a life insurer

Reference:
Andrew Kuritzkes, Til Schuermann and Scott M. Weiner, "Risk Measurement, Risk Management and Capital Adequacy in Financial Conglomerates, Brookings-Wharton Papers on Financial Services: 2003. Ed. Robert E.

34. As the inexperienced global head of operational risk for DEF Financial Services, you are trying to make a decision about how to quantify your firm's operational risk exposure. You've decided the best combination of methodologies to use would be factor-based models and the capital asset pricing model. Now, six months after you've implemented your approach you've identified some major limitations in your decision on the methodologies to use. Which of the following best describes those limitations?

I. You are unable to reliably predict an operational risk event on a detailed level.
II. Collecting and aggregating consistent data across the firm is challenging.
III. You are unable to capture interdependencies between areas of your firm.
IV. You are unable to reliably forecast general trends in operational risk events.

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

Answer: c

I. Correct. Factor-based models and the capital asset pricing model both allow for forecasting general trends but are not reliable for predicting on a detailed level.
II. Correct. Both methodologies require sufficient data to implement and collecting and aggregating consistent data across any global firm is challenging.
III. Correct. A disadvantage both methods is their inability to capture overlaps between areas of a firm
IV. Incorrect. Factor-based models and the capital asset pricing model both allow for forecasting general trends but are not reliable for predicting on a detailed level.

Reference:
Reto Gallati, Risk Management and Capital Adequacy (New York: McGraw-Hill, 2003).,
Chapter 6 – Case Studies

35. A portfolio has an average return over the last year of 13.2%. Its benchmark has provided an average return over the same period of 12.3%. The portfolio's standard deviation is 15.3%, its beta is 1.15, its tracking error volatility is 6.5% and its semi-standard deviation is 9.4%. Lastly the risk free rate is 4.5%. Calculate the portfolio's Information Ratio (IR).

a. 0.569
b. 0.076
c. 0.138
d. 0.096

Answer: c

a. Incorrect. See below.
b. Incorrect. See below.
c. Correct. See below.
d. Incorrect. See below.

$$\text{Information Ratio} = \frac{\text{Average Rtn on the Portfolio} - \text{Ave Rtn on the benchmark}}{\text{Tracking Error Volatility}}$$

$$\text{IR} = \frac{13.2 - 12.3 = 0.138}{6.5}$$

This question tests whether the candidate knows the information ratio. It has a number of distractors that make it difficult to 'guess' the formula.

Reference:
Noel Amenc and Veronique Le Sourd, Portfolio Theory and Performance Analysis (West Sussex: Wiley, 2003), Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

36. Steve, a market risk manager at Marcat Securities, is analyzing the risk of the S&P500 Index options trading desk. His risk report shows the desk is net long gamma and short vega. Which of the following portfolios of options show exposures consistent with this report?

a. The desk has substantial long expiry long Call positions and substantial short expiry short Put positions.
b. The desk has substantial long expiry long Put positions and substantial long expiry short Call positions.
c. The desk has substantial long expiry long Call positions and substantial short expiry short Call positions.
d. The desk has substantial short expiry long Call positions and substantial long expiry short Call positions.

Answer: d

a. Incorrect. Long expiry long Call is long vega positions. Short expiry short Put is short gamma positions.
b. Incorrect. Long expiry long Put is long vega positions. Long expiry short Call is short vega positions.
c. Incorrect. Long expiry long Call is long vega positions. Short expiry short Call is short gamma positions.
d. Correct. Short expiry long call is long gamma positions. Long expiry short call is short vega positions.

Gamma risk = short expiry position
Vega risk = long expiry position
Long call/put = long gamma/vega
Short call/put = short gamme/vega

Reference:
John Hull, Options, Futures, and Other Derivatives, 6th ed. (New York: Prentice Hall, 2006)., Chapter 16 – Volatility Smiles

Linda Allen, Jacob Boudoukh, Anthony Saunders, Understanding Market, Credit and Operational Risk: The Value At Risk Approach (Oxford: Blackwell Publishing, 2004)., Chapter 3 – Putting VaR to Work

37. You are given the following information about a portfolio and are asked to make a recommendation about how to reallocate the portfolio to improve the risk/return tradeoff.

Asset	Expected Return	Standard Deviation	Current Weight	Covariance of portfolio and asset returns	Marginal Return	Marginal Risk	Marginal Return/ Marginal Risk	Risk Contribution
Asset 1	7.10%	17.00%	38.70%	1.43%	3.10%	13.99%	22.17%	5.41%
Asset 2	8.00%	40.60%	6.20%	2.44%	4.00%	23.93%	16.71%	1.48%
Asset 3	6.70%	44.80%	5.50%	2.39%	2.70%	23.39%	11.55%	1.29%
Asset 4	6.90%	21.40%	14.60%	1.41%	2.90%	13.86%	20.92%	2.02%
Risk Free	4.00%	0.00%	35.00%	0.00%				

Which of the following the recommendations will improve the risk/return tradeoff of the portfolio?

a. Increase the allocations to assets 1 and 3 and decrease the allocations to assets 2 and 4.
b. Increase the allocations to assets 1 and 2 and decrease the allocations to assets 3 and 4.
c. Increase the allocations to assets 2 and 3 and decrease the allocations to assets 1 and 4.
d. Increase the allocations to assets 1 and 4 and decrease the allocations to assets 2 and 3.

Answer: d

a. Incorrect. Asset 3 should be decreased since it has the lowest marginal return-to-marginal risk ratio.
b. Incorrect. Asset 4 should be increased since it has the highest marginal return-to-marginal risk ratio.
c. Incorrect. Asset 4 should be increased since it has the highest marginal return-to-marginal risk ratio.
d. Correct. A portfolio optimizing the risk-reward tradeoff has the property that the ratio of the marginal return to marginal risk of each asset is equal. Therefore, this option is the only recommendation that will move the ratios in the right direction.

Reference:
Philippe Jorion, Value at Risk: The New Benchmark for Managing Financial Risk, 3rd ed. (New York: McGraw-Hill, 2007)., Chapter 17 – VaR and Risk Budgeting in Investment Management

38. Which of the following statements is the least accurate about the foundation IRB and the advanced IRB approaches for credit risk capital charge in the Basel II?

a. Under the advanced IRB approach, banks are allowed to use their own estimates of PD, LGD, EAD, and correlation coefficient, within the risk-weight functions provided by the supervisors.
b. Under the foundation IRB approach, banks provide their own estimates of PD and rely on supervisory estimates for other risk components.
c. Banks adopting the advanced IRB approach are expected to continue to employ this approach. A voluntary return to the standardized approach is permitted
d. Under both foundation IRB and advanced IRB approaches, the expected loss is not included in the credit risk capital charge.

Answer: a

Under the advanced IRB approach, banks are allowed to provide their own estimate of PD, LGD, and EAD, but must use the correlation coefficient formula specified by the supervisor.

Reference:
Basel Committee on Banking Supervision Publication, November 2006, Studies on credit risk concentration: an overview of the issues and a synopsis of the results from the Research Task Force project"

39. The risk of the occurrence of a significant difference between the mark-to-model value of a complex and/or illiquid instrument, and the price at which the same instrument is revealed to have traded in the market is referred to as:

a. Dynamic Risk
b. Liquidity Risk
c. Mark-to-Market Risk
d. Model Risk

Answer: d

a. 'a' and 'c' are undefined terms
b. The risk of not being able to sell an asset quickly
c. Undefined term
d. This is how model risk is defined in the reading

Reference:
Kevin Dowd, Measuring Market Risk, 2nd ed., (West Sussex: John Wiley & Sons, Inc., 2005)., Chapter 16 – Model Risk

40. Let X be a uniformly distributed random variable between minus one and one so that the standard deviation of X is 0.577. What percentage of the distributions will be less than 1.96 standard deviations above the mean:

a. 100%
b. 97.5%
c. 95%
d. Insufficient information provided.

Answer: a

The answer requires understanding of distributions and standard deviation. The key is that every distribution has a standard deviation. However the number of standard deviations associated with different probabilities are different for each distribution. In this case 1.96 standard deviation represents a move of 1.12 or less. As the total distribution is defined as falling between minus one and one the correct answer is 'a'.

b. is the percentage if the underlying distribution was normal (one tail test)
c. is the percentage if the underlying distribution was normal (two tail test)

Reference:
Murray R. Spiegel, John Schiller, and R. Alu Srinivasan, Probability and Statistics, Schaum's Outlines, 2nd ed. (New York: McGraw-Hill, 2000), Chapter 2 – Random Variables and Probability Distributions

NOTES

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