2014 年 5 月 FRM 一级模拟考试（二）_参考答案

1. Answer: C

假设 2002 年 7 月 l 日生效的远期合约的远期价格为 F_1。，2002 年 9 月 1 日生效的远期合约的远期价格为 F_2。如果在 2003 年 1 月 l 日，日元的价格是 S_T，那么在那时第一份合约的价值是 S_T-F_1 ，；而第二份合约的价值是 F_2- S_T 。因此，两份合约的总收益是：$S_T - F_1 + F_2 - S_T = F_2 - F_1$。因此，如果在 2002 年 7 月到 9 月之间，在 2003 年 l 月 1 日交割的远期价格上升，那么公司将从中获利。

2. Answer: C

当保证金账户中损失了 1000 美元时会导致保证金催付。而这种情况会在白银价格上升 1000 / 5000 = 0 . 20 美元时出现。因此，只有当白银价格上升至每盎司 5 . 40 美元时才会导致保证金催付。如果不交足保证金，你的经纪人会将你的头寸强行平仓。

3. Answer: D

首先，交易所成员需要缴纳第二天新合约的初始保证金，为 20×2000=40000（美元）。其次，第一天订立的合约获得了收益，为（50200－50000) ×100 = 20000（美元）。第三，第二天订立的新合约有损失，为（51000－50200)×20 =16000（美元）。因此，该成员需要补交的保证金为：40000－20000+ l6000 = 36000（美元）。

4. Answer: A

应卖空的合约数量为：$1.2 \times \frac{20000000}{1080 \times 250} = 88.9$

近似为整数，应卖空的合约数为 89。

如果欲将贝塔值降低到 0.6，应卖空的合约数为前者的一半，即应卖空 44 份合约。

5. Answer: B

根据式子 $h^* = \rho \frac{\sigma_S}{\sigma_F}$，可得最优的套期保值比率是 $0.8 \times \frac{0.65}{0.81} = 0.642$

这表示在 3 个月期的套期保值中期货头寸的规模应是公司风险敞口规模的 64.2%。

6. Answer: C

由题意可知 $m = 2, d = e^{-0.07\times 2}$，并且：$A = e^{-0.05\times0.5} + e^{-0.06\times1.0} + e^{-0.065\times1.5} + e^{-0.07\times2.0} = 3.6935$

可得到平均收益率为：$\frac{(100 - 100\times 0.8694)\times 2}{3.6935} = 7.072$

为了证明结论的正确性，可以计算息票率为 7.072 % （即半年支付 3.5365）的债券的

价值，即：$3.536e^{-0.05\times0.5}+3.536e^{-0.06\times1.0}+3.536e^{-0.065\times1.5}+103.536e^{-0.07\times2.0}=100$

即说明 7.072%为平价收益率。

7. Answer: A

当利率期限结构是向上倾斜时，c > a > b；当利率期限结构是向下倾斜时，b > a > c。

8. Answer: D

持有两份息票利率为 4%的债券的多头，一份息票利率为 8%的债券的空头。由于利息抵消，那么当期的现金流是 90－2×80 =－70 , 10 年后的现金流是 200－100 =100 。所以 10 年期的即期利率为：$\frac{1}{10}\ln\frac{100}{70}=0.0357$；即每年 3.57%。

9. Answer: C

6 个月的即期利率是 21n (1 + 6 / 94)=12.38 % ;

12 个月的即期利率是 ln (l + 11 / 89 ）=11.65 % ;

令 l .5 年的即期利率为 R ，则有：

$$4e^{-0.1238\times0.5}+4e^{-0.1165\times1.0}+104e^{-1.5R}=94.84$$
$$e^{-1.5R}=0.8415$$
$$R=0.115$$

解之可得 R = 11.5 %

再令 2 年期债券的即期利率为 R ，则有：

$$5e^{-0.1238\times0.5}+5e^{-0.1165\times1.0}+5e^{-0.115\times1.5}+105e^{-2R}=97.12$$
$$e^{-2R}=0.7977$$
$$R=0.113$$

解得 R = 11.3 %.

10. Answer: A

a. 债券的价格为：

$$8e^{-0.11}+8e^{-0.11\times2}+8e^{-0.11\times3}+8e^{-0.11\times4}+108e^{-0.11\times5}=86.80$$

b. 债券的久期为：

$$\frac{1}{86.80}\left[8e^{-0.11}+2\times8e^{-0.11\times2}+3\times8e^{-0.11\times3}+4\times8e^{-0.11\times4}+5\times108e^{-0.11\times5}\right]=4.256\text{年}$$

c. 因此，

债券收益率 0.2%的下降对其收益率的影响为：$86.80\times4.256\times0.002=0.74$

债券的价格应当从 86.80 增加到 87.54。

另外一种方法，目前债券收益率为 11%，下降 0.2%至 10.8%，具有收益率为 10.8%的债券价格为：

$$8e^{-0.108}+8e^{-0.108\times 2}+8e^{-0.108\times 3}+8e^{-0.108\times 4}+108e^{-0.108\times 5}=87.54$$

11. Answer: C

期货合约的有效期限为5个月，其中有3个月的红利率为2% , 2个月的红利率为5%,则平均月红利率为 $\frac{1}{5}\left(3\times 2+2\times 5\right)\%=3.2\%$，所以期货价格为

$300e^{(0.09-0.032)\times 0.4167}=307.34$.

12. Answer: A

期货价格的理论值为 $0.65e^{0.1667\times(0.08-0.03)}=0.6554$，而实际的价格比这个价格高。那么套利者就可借美元买瑞士法郎现货，并且卖空瑞士法郎期货。

13. Answer: C

九个月储存成本的现值是： $0.06+0.06e^{-0.25\times 0.1}+0.06e^{-0.5\times 0.1}=0.176$,

期货的价格为 $F_0=\left(9.000+0.176\right)e^{0.1\times 0.75}=9.89$

14. Answer: B

凸度调整为： $\frac{1}{2}\times 0.011^2\times 6\times 6.25=0.002269$ 大约23个基点。

如果季计复利，且以实际/360计算天数，则期货利率为4.8%；如果以实际/实际计算天数，那么期货利率变成:4.8%*365/360=4.867%;如果以连续复利计算，那么期货利率变成：4ln(1+0.4867/4)=4.84%.因此，以连续复利计算的远期利率为4.84-0.23=4.61%。

15. Answer: D

The treasurer should short Treasury bond futures contract. If bond prices go down, this futures position will provide offsetting gains. The number of contracts that should be shorted is

10, 000, 000 × 7.1/(91,375 × 8.8)= 88.30

Rounding to the nearest whole number 88 contracts should be shorted

16. Answer: A

The Eurodollar futures contract price of 89.5 means that the Eurodollar futures rate is 10.5% per annum with quarterly compounding and an actual/360 day count. This becomes 10.5 × 365/360 = 10.646% with an actual/actual day count.

This is：41n(1 + 0.25 ×0.10646) = 0.1051or 10.51% with continuous compounding.

The forward rate given by the 91-day rate and the 182-day rate is 10.4% with continuous compounding. This suggests the following arbitrage opportunity:

1 Buy Eurodollar futures.

2 Borrow 182-day money.

3. Invest the borrowed money for 91 days.

17. Answer: C

4 个月后收到 6 百万美元并支付 4.80 百万美元。10 个月后将收到 6 百万美元并支付 4 个月后适用的 LIBOR。互换的固定利率债券的价值为：$6e^{-0.1\times4/12}+106e^{-0.1\times10/12}=103.328$(百万美元）

互换中的浮动利率债券的价值为：$(100+4.8)e^{-0.1\times4/12}=101.364$(百万美元）

对于支付浮动利率的一方而言，互换的价值为 103.328-101.364=1.964 百万美元。对于支付固定利率的一方而言，互换的价值为-1.964 百万美元。通过将互换分解为远期合约，同样可以计算出互换的价值。首先考虑支付浮动利率的一方：第一份远期合约涉及在 4 个月后支付 4.80 百万美元并收到 6 百万美元，其价值为 1.611 百万美元。在计算第二份远期合约时，首先注意按连续复利计算的远期利率为 10%，即按半年计复利的远期利率为年 10.254%，远期合约价值为：$100\times(0.12\times0.5-0.10254\times0.5)e^{-0.1\times10/12}=0.803$(百万美元）

因此远期合约总价值为 1.1.61+0.803=1.964 百万美元

18. Answer: C

互换涉及英镑利息 2.80 百万和美元利息 3 百万的交换。在互换到期时还必须交换本金。互换中英镑债券的价值为：$\frac{2.8}{(1.11)^{1/4}}+\frac{22.8}{(1.11)^{5/4}}=22.739$(百万美元）

互换中美元债券的价值为：$\frac{3}{(1.08)^{1/4}}+\frac{33}{(1.08)^{5/4}}=32.916$（百万美元）

对于支付英镑的一方而言，互换的价值为 32.916-（22.739*1.65）= -4.604 百万美元；对于支付美元的

19. Answer: D

在第三年末，金融机构将要收取 50 万美元并支付 45 万美元，损失为 5 万美元。为估计互换剩余年限的价值，假定远期利率是已知的。所有的远期利率为 8%（年率）。在剩余年限里，浮动支付价值为 0.5*0.08*1000=40 万美元，净收益为 50-40=10 万美元，即每次支付的现金流为 10 万美元。第 3 年末到第 5 年末的现金流为：

3 年：5 万美元；

3.5 年： 10 万美元；

4 年：10 万美元；

4. 5 年：10 万美元；

5 年： 10 万美元.

违约成本等于所有现金流的现值，将现金流折现到第 3 年，折现率为 4%（半年），得到违约成本 41.3 万美元。

20. Answer: A

The two-year swap rate implies that a two-year LIBOR bond with a coupon of 11% sells for par. If R_2 is the two-year zero rate

$$11e^{-0.10\times1.0}+111e^{-R_2\times2.0}=100$$

so that $R_2=0.1046$ The three-year swap rate implies that a three-year LIBOR bond with a coupon of 12% sells for par. If R_3 is the three-year zero rate

$$12e^{-0.10\times1.0}+12e^{-0.1046\times2.0}+112e^{-R_3\times3.0}=100$$

so that $R_3=0.1146$ The two- and three-year rates are therefore 10.46% and 11.46% with continuous compounding.

21. Answer: B

根据不支付股利股票的看跌期权价格下限的公式：$Ke^{-rt}-S_0$

其中，S_0=12，K=15，r=6%，T=0.08333，则：$15e^{-0.06\times0.08333}-12=2.93$

22. Answer： A

执行价格的现值为$60e^{-\frac{4}{12}\times0.12}=57.65$美元，股利的现值为$0.80e^{-\frac{1}{12}\times0.12}=0.79$。因为：

$5<64-57.65$ (

不满足公式：$C\geq S_0-D-Ke^{-rt}$

所以，该期权被低估。如果股票价格下降到低于 60 美元，该套利者将会损失 5 美元期权费，但是从空头方可以至少获得现值 64-57.65-0.79=5.56 美元的利润。如果股票价格在期权到期时的股票价格超过了 60 美元，套利者获得的现值为 5.56-5.00=0.56 美元。

23. Answer: C

美式看跌看涨期权存在如下关系：$S_0-K<C-P<S_0-Ke^{-rt}$

在本题中：$31-30<4-P<31-30e^{-0.08\times0.25}$

即：$2.41<P<3.00$

因此，美式看跌期权的价格的下限和上限分别为 2.41 美元和 3.00 美元。

24. Answer: A

Problem 11.5.

A stock price is currently \$100. Over each of the next two six-month periods it is expected to go up by 10% or down by 10%. The risk-free interest rate is 8% per annum with continuous compounding. What is the value of a one-year European call option with a strike price of \$100?

In this case $u = 1.10$, $d = 0.90$, $\Delta t = 0.5$, and $r = 0.08$, so that

$$p = \frac{e^{0.08\times0.5} - 0.90}{1.10 - 0.90} = 0.7041$$

The tree for stock price movements is shown in Figure S11.1. We can work back from the end of the tree to the beginning, as indicated in the diagram, to give the value of the option as \$9.61. The option value can also be calculated directly from equation (11.10):

$$[0.7041^2 \times 21 + 2 \times 0.7041 \times 0.2959 \times 0 + 0.2959^2 \times 0]e^{-2\times0.08\times0.5} = 9.61$$

or \$9.61.

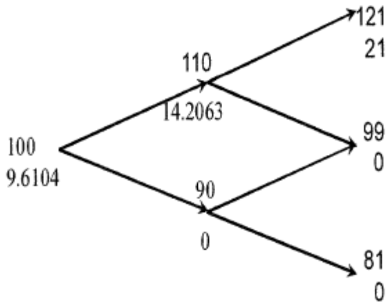

Figure S11.1 Tree for Problem 11.5

25. Answer: A

In this case So = 250, q = 0.04, r = 0.06, T = 0 25, K = 245, and c = 10. Using put-call parity

$$c\ Ke^{-.TT} = p\ Soe^{-\delta\ t\ T}$$

or

$$p = c\ Ke^{r}\ SOe^{qT}$$

Substituting:

$$p = 10 -+ 245e^{-0,25x0.06} — 250e\text{-}0\ 25x0\ 04 = 3.84$$

The put price is 3.84.

26. Answer: B

The implied dividend yield is the value of q that satisfies the put--call parity equation. It is the value of q that solves

154 + 1400 exp (-0.05×0 5) = 34.25 + 1500exp (-0.5q)

This is q=1.99%.

27. Answer: C

(1) The delta indicates that when the value of the euro exchange rate increases by \$0.01, the value of the bank's position increases by 0.01 x 30, 000 = \$300. The gamma indicates that when

the euro exchange rate increases by $0.01 the delta of the portfolio decreases by 0.01 x 80, 000 = 800. For delta neutrality 30,000 euros should be shorted. When the exchange rate moves up to 0.93, we expect the delta of the portfolio to decrease by (0.93 -- 0.90) x 80, 000 = 2, 400 so that it becomes 27,600. To maintain delta neutrality, a net 27,600 have been shorted.

(2) When a portfolio is delta neutral and has a negative gamma, a loss is experienced when there is a large movement in the underlying asset price. We can conclude that the bank is likely to have lost money.

28. Answer: B

The delta of the portfolio is：-1,000×0.50-500×0.80-2,000×(-0.40) -500 X 0.70 = -450

The gamma of the portfolio is：-1,000 ×2.2-500 ×0.6-2,000 ×1.3-500 ×1.8= -6000

The vega of the portfolio is: -1,000 ×1.8- 500 ×0.2-2,000 ×0.7-500 ×1.4= -4000

A long position in 4,000 traded options will give a gamma-neutral portfolio since the long position has a gamma of 4, 000 ×1.5 = +6, 000. The delta of the whole portfolio (including traded options) is then: 4,000 ×0.6 -450 = 1, 950

Hence, in addition to the 4,000 traded options, a short position in 1,950 is necessary so that the portfolio is both gamma and delta neutral.

29. Answer: C

资产 A 和资产 B 的日波动性均为 1%，则投资于资产 A 和资产 B 的日标准差均为 1000 美元。所以投资组合的日方差为：$1000^2+1000^2+2\times0.3\times1000\times1000=2600000$

投资组合的标准差为方差的平方根，即 1612.45 美元。

所以，5 天的标准差为：$1612.45\times\sqrt{5}=3605.55$

从 N（X）的分布表中可以查到，N（-2.33）=0.01

这意味着一个服从正态分布变量低于其均值超过 2.33 个标准差的概率为 1%，因此 5 天 99%的风险价值为 2.33*3605.55=8401 美元。

30. Answer: A

组合价值日波动与日变动之间的近似关系为：$\Delta P=56\Delta S$

汇率日变动百分比等于$\Delta S/1.5$

由此得到：$\Delta P=56\times1.5\Delta x$,即:$\Delta P=84\Delta x$

Δx的标准差等于汇率的日波动性，即 0.7%。因此，P 的标准差是 84*0.007=0.588.，可以得到组合 10 天的 99%的 VAR 是

$0.588\times2.33\times\sqrt{10}=4.33$

31. Answer: A

资产组合的方差（以千美元计）为：

$0.018^2 \times 300^2 + 0.012^2 \times 500^2 + 2 \times 300 \times 500 \times 0.6 \times 0.018 \times 0.012 = 104.04$

标准差为 $\sqrt{104.04} = 10.2$

由于 N（-1.96）=0.0025，则 1 天 97.5%的 VAR 为 10.2*1.96=19.99， 10 天 97.5%的 VAR 为 $\sqrt{10} \times 19.99 = 63.22$

所以 10 天 97.5%的 VAR 为 63320 美元。

32. Answer：D

黄金投资的 10 天 97.5%的 VAR 为 $5400 \times \sqrt{10} \times 1.96 = 33470$美元；白银投资的 10 天 97.5%的 VAR 为 $6000 \times \sqrt{10} \times 1.96 = 37188$

所以，多样化收益，即分散投资降低的 VAR 为：33470+37188-63220=7438 美元

33. Answer: A

a. The GARCH model has a finite unconditional variance, so statement c. is correct. In contrast, because $\alpha_1 + \beta$ sum to 1, the EWMA model has undefined long-run average variance. In both models weights decline exponentially with time.

34. Answer: B

b. The statement compares two portfolios with the same duration. A barbell portfolio consists of a combination of short-term and long-term bonds. A bullet portfolio has only medium-term bonds. Because convexity is a quadratic function of time to wait for the payments, the long-term bonds create a large contribution to the convexity of the barbell portfolio, which must be higher than that of the bullet portfolio.

35. Answer: C

c. Answers a. and b. have payoffs that depend on the stock price and therefore cannot create arbitrage profits. Put-call parity says that $c - p = 3 - 2 = \$1$ should equal $S - Ke^{-r\tau} = 42 - 44 \times 0.9048 = \$2.19$. The call option is cheap. Therefore buy the call and hedge it by selling the stock, for the upside. The benefit from selling the stock if S goes down is offset by selling a put.

36. Answer: A

a. If the stock does not pay a dividend, the value of the American call option alive is always higher than if exercised (basically because there is no dividend to capture).

Hence, it never pays to exercise a call early. On the other hand, exercising an American put early may be rational because it is better to receive the strike price now than later, with positive interest rates.

37. Answer: A

a. MGRM had purchased oil in short-term futures market as a hedge against the long-term sales. The long futures positions lost money due to the move into contango, which involves the spot price falling below longer-term prices.

38. Answer: C

c. All the statements are correct except IV., because too many scenarios will make it more difficult to interpret the risk exposure.

39. Answer: C

c. This is the reverse problem. The CAPM return is $R_F + \beta[E(R_M) - R_F] = 5 + 0.5[10 - 5] = 7.5\%$. Hence the alpha is $8 - 7.5 = 0.5\%$.

40. Answer: B

The trader would need to adjust the hedge as follows: \$89.8million ×1.0274=\$92.26million

Thus, the trader needs to purchase additional TIPS worth \$2.46million.

41. Answer: D

First convert the cutoff points of 32 and 116 into standard normal deviates. The first is $z_1 = \frac{32-80}{24} = -2$, and the second is $z_2 = \frac{116-80}{24} = 1.5$.

From normal tables, $P(-2 < Z < 1.5) = P(Z < 1.5) - (Z < -2) = 0.9332 - 0.0228 = 0.9104$

42. Answer: A

a. The significance level is also the probability of making a type 1 error, or to reject the null hypothesis when true, which decreases. This is the opposite of answers b. and c., which are false. This leads to an increase in the likelihood of making a type 2 error, which is to accept a false hypothesis, so answer d. is false.

43. Answer: B

b. Using Equation (3.27), the R-squared is given by $\beta^2\sigma_M^2/\sigma_P^2 = 0.977^2 \times 0.156^2/0.167^2 = 0.83$.

44. Answer: D

d. Age and experience are likely to be highly correlated. Generally, multicollinearity manifests itself when standard errors for coefficients are high, even when the R^2 is high.

45. Answer: C.

Applying the discount factors implied by the three base bonds, the present value of the 2.0% bond is $96.594.

As the bond's market price is $99.00, the 2.0% 11/30/2014 mis-priced bond is "trading rich": market price of $99.00 > model (PV) price of $96.594.

The arbitrage trade will be to sell the rich bond and buy the replicating portfolio.

We don't require all three trades, only the trade with respect to the 6.0% 1.5-year base bond because only one cash flow is involved at 1.5 years.

Replication requires the final cash flows to match such that: F(1.5)*(1+6%/2) = (1+2%/2), and F(1.5) = (1+2%/2)/(1+6%/2) = 98.058% = 0.98058.

So, the replicating portfolio trade includes a purchase (long) of 98.058% of the face amount of the 6% coupon bond which has a cost of 98.058% * $102.40 = $100.4117.

combined with a short of 1-.857% of the 4% coupon bond and short -1.894% of the 5.0% bond, the net cost to buy (long) the replicating portfolio is $96.594, which coincides with the model (PV) price of the 2.0% bond. This will create perfectly offsetting cash flows yet produce an initial profit of $99.00 (i.e., sell the trading rich bond) - $96.594 (i.e., buy the replicating portfolo) = $2.406 arbitrage profit.

46. Answer: B

b. The persistence $(\alpha_1 + \beta)$ is, respectively, 0.94, 0.98, 0.97, and 0.96. Hence the model with the highest persistence will take the longest time to revert to the mean.

47. Answer: D

d. The GARCH model has mean reversion in the conditional volatility, so statements a. and b. are correct. When σ_t is lower than the long-run average, the volatility structure goes up. Higher persistence $\alpha + \beta$ means that mean reversion is slower, so statement c. is correct.

48. Answer: A

NPV= 4 / 1.10 + 3 / $(1.10)^2$ + 4 / $(1.10)^3$ – \$10 = –\$0.879038 million, or –\$879,038

Calculator approach: CF0 =-10; CF1= 4; CF2 n=3; CF3 = 4;I = 10 →NPV= -\$0.879038 (million)

49. Answer: C

Heteroskedasticity exists if the variance of the residuals is not constant. In a heteroskedastic regression, the t-statistics will be incorrectly calculated using ordinary least squares methods.

50. Answer: C

$$\sigma_n^2 = \lambda\sigma_{n-1}^2 + (1-\lambda)u_{n-1}^2 = 0.96(0.015^2) + (1-0.96)(0.01^2)$$
$$= 0.000216 + 0.000004 = 0.00022$$

$$\sigma = \sqrt{0.00022} = 0.01483 \text{ or } 1.48\%$$

(See Book 2, Topic 19)

51. Answer: C

The capital asset pricing model (CAPM) assumes the following:

- Investors desire to maximize their expected utility of wealth at the end of next period.
- Investors are risk averse.
- Investors are only concerned with the mean and standard deviation of returns.
- Assets are fully divisible.

52. Answer: A

A result is statistically significant if it is unlikely to have happened by chance. The decision rule is to reject the null hypothesis if the p-value is less than the significance level. If the p-value is less than the significance level, then we conclude that the sample estimate is statistically different than the hypothesized value.

53. Answer: C

Any security with a rating below BBB by S&P or Baa by Moody's is a speculative or non-investment grade instrument.

54. Answer: C

Bond C is the cheapest-to-deliver bond, at $0.11.

Bond	Cost of Delivery
A	103-(98.03*1.03)=$2.03
B	116-(98.03*1.12)=$6.21
C	105-(98.03*1.07)=$0.11
D	124-(98.03*1.23)=$3.42

55. Answer: B

The VaR of this investment can be interpreted as either (1) there is a 95% probability that the portfolio will lose no more than $18 million on a given day or (2) there is a 5% probability that the portfolio will lose more than $18 million on a given day.

56. Answer: A

Hedged position: $2,500,000 SGD x $0.80 CAD/SGD = $2,000,000 CAD

Unhedged position: $2,500,000 x $0.73 CAD/SGD =$1,825,000 CAD

57. Answer: A

The simple linear regression F-test tests the same hypothesis as the t-test because there is only one independent variable. The F-statistic is used to tell you if at least one independent variable in a set of independent variables explains a significant portion of the variation of the dependent variable. It tests the independent variables as a group, and thus won't tell you which variable has significant explanatory power. The F-test decision rule is to reject the null hypothesis if the F>Fc.

58. Answer: C

Using the interest rate parity formula, the futures exchange rate is computed as follows:

$$F_0 = S_0 e^{(r_{DC} - r_{FC})T}$$

$$F_0 = 1.02e^{(0.01 - 0.02)(7/12)} = \$1.014 / CHF$$

59. Answer: D

d. CVAR is the average of losses worse than VAR, so answer a. is incorrect. Expressed in absolute value, VAR is lower than any other losses used for CVAR, so VAR must be the most optimistic loss.

60. Answer: A

a. We compute the daily VAR by dividing each VAR by the square root of time. This gives $316/\sqrt{10} = 100$, then 120, 120, and 120. So, answer a. is out of line.

61. Answer: A

a. Basis risk is minimized when the maturity of the hedging instrument coincides with the horizon of the hedge (i.e., two months) and when the hedging instrument is exposed to the same risk factor (i.e., IBM).

62. Answer: C

c. Basis risk can arise if the maturities are different, so answer I. is incorrect. A short hedge position is long the basis, which means that it benefits when the basis strengthens, because this means that the futures price drops relative to the spot price, which generates a profit.

63. Answer: B

b. XYZ will incur a loss if the price of gold falls, so should short futures as a hedge. The optimal hedge ratio is $\rho\sigma_s/\sigma_f = 0.86 \times 3.6/4.2 = 0.737$. Taking into account the size of the position, the number of contracts to sell is $0.737 \times 10{,}000/10 = 737$.

64. Answer: D

d. To hedge, the portfolio manager should sell index futures, to create a profit if the portfolio loses value. The portfolio beta is $0.65 \times (7\%/6\%) = 0.758$. The number of contracts is $N^* = -\beta S/F = -(0.758 \times 5{,}000{,}000)/(1{,}500 \times 100) = -25.3$, or 25 contracts.

65. Answer: D.

N(T note) = $40,000,000 * 0.025/0.062 = $16,129,032.

66. Answer: C

c. OTM call options are not very sensitive to dividends, as indicated in Figure 14.7, so answer a. is incorrect. This also shows that ITM options have the highest ρ^* in absolute value.

67. Answer: C

c. The delta must be around 0.5, which implies a linear VAR of \$100,000 × 10.4% × 0.5 = \$5,200. The position is long an option and has positive gamma. As a result, the quadratic VAR must be lower than \$5,200.

68. Answer: A

The model corresponds to α = 0.05, β = 0.92, and ω = 0.000005. Because $\gamma = 1 - \alpha - \beta$, it follows that γ = 0.03. Because the long-run average variance, V_L, can be found by VL = ω / γ, it follows that V_L = 0.000167. In other words, the long-run average volatility per day implied by the model is sqrt(0. 000167) = 1.29%.

69. Answer: C.

Use Bayes' Theorem:

P(Passage|NoChange) = P(NoChange|Passage)* P(Passage) / P(NoChange)

= (0.3 * 0.2) / (0.2*0.3 + 0.5 * 0.3 + 0.3* 0.2) = 0.222

70. Answer: D.

At low yields, a callable bond exhibits negative convexity but this does not imply negative duration; rather, it implies only that duration is increasing rather than decreasing (more specifically, as low yields increase, negative convexity implies the dollar duration [the slope of the tangent line] is decreasing from negative to more negative. As the negative convexity gives over to "regular" convexity, the dollar duration [the slope] continues to be negative but increasing to less negative. Regardless, even with the negative convexity, the duration is always positive (i.e., the slope of the tangent is always negative)

71. Answer: D

I is a model failure and II is an internal failure. These are types of operational risks

72. Answer: C

If the daily, 90% confidence level Value at Risk (VaR) of a portfolio is correctly estimated to be USD 5,000, one would expect that 90% of the time (9 out of 10), the portfolio will lose less than USD 5,000; equivalently, 10% of the time (1 out of 10) the portfolio will lose USD 5,000 or more.

73. Answer: C

Fixed rate coupon = USD 300 million x 7.5% = USD 22.5 million

Value of the fixed payment = B_{fix} = 22.5$e^{-0.07}$ +322.5$e^{-0.08*2}$ = USD 295.80 million

Value of the floating payment= $B_{floating}$ = USD 300 million. Since the payment has just been made the value of the floating rate is equal to the notional amount.

Value of the swap= $B_{floating}$ - B_{fix} =USD 300-USD 295.80=USD 4.2 million

74. Answer: C

The calculation is as follows: Two-thirds of the equity fund is worth USD 40 million. The Optimal hedge ratio is given by h = 0.89 * 0.51 / 0.48 = 0.945

The number of futures contracts is given by

N=0.945 * 40,000,000 / (910 * 250) = 166.26≈167, round up to nearest integer.

75. Answer: D

Day	Futures Price	Daily Gain (Loss)	Cumulative Gain (Loss)	Margin Account Balance	Margin Call
June 1	497.30	(270)	(270)	1730	
June 2	492.70	(460)	(730)	1270	
June 3	484.20	(850)	(1580)	420	1580
June 4	471.70	(1250)	(2830)	750	1250
June 5	468.80	(290)	(3120)	1710	

76. Answer: C.

Risk premium attributable to F(1) = B(A,1)*(9.0% - 2.0%) = 0.40*7.0% = 2.80%;

Risk premium attributable to F(2) = B(A,2)*(11.0% - 2.0%) = 0.80*9.0% = 7.20%; and

Expected return to portfolio (A) = 2.0% + 2.80% + 7.20% = 12.00%.

77. Answer: D

A is incorrect. When calls are deep in-the-money and puts are deep out-of-the-money, deltas are NOT most sensitive to changes in the underlying asset.

B is incorrect. When both calls and puts are deep in-the-money, deltas are NOT most sensitive to changes in the underlying asset.

C is incorrect. When both calls and puts are deep out-of-the-money, deltas are NOT most sensitive to changes in the underlying asset.

D is correct. When both calls and puts are at-the-money, deltas are most sensitive to changes in the underlying asset, (Gammas are largest when options are at-the-money)

78. Answer： C

A is incorrect. The chance of BBB loans being upgraded over 1 year is 4.08% (0.02 + 0.21 + 3.85).

B is incorrect. The chance of BB loans staying at the same rate over 1 year is 75.73%.

C is correct. 88.21% represents the chance of BBB loans staying at BBB or being upgraded over 1 year.

D is incorrect. The chance of BB loans being downgraded over 1 year is 5.72% (0.04 + 0.08 + 0.33 + 5.27).

79. Answer: c.

The daily VaR at 95% confidence level is given by the fifth worst loss over the period which is -1%.

80. Answer: D

Use Bayes' Theorem:

P(NEUTRAL | Constant) = P(Constant | Neutral) * P(Neutral) / P(Constant)

= 0.2 * 0 3 / (0.1 * 0.2 + 0.2*0.3 + 0.15 * 0.5) = 0.387

A. This is the Prob(Constant)

B. This is the Prob(Constant)

C. This is the Prob(Neutral | Decrease)

81. Answer: D

The basic problem at Barings was operation risk control. Nick Leesons was in charge of trading and settlement. This dual responsibility allowed him to hide losses by crossing trades at fabricated prices. He then booked the profitable side of the trade in accounts that were reported and the unprofitable side in an unreported account. The lack of supervision also permitted him to shift from hedged trading strategies to speculative strategies in an effort to hide previously incurred losses. Clearly his reporting to multiple managers in a convoluted organizational structure led to ambiguity concerning who was responsible for performing specific oversight functions.

Leeson used a short straddle strategy on the Nikkei 225 and held speculative double long positions in the market for Nikkei 225 futures contracts.

Liquidity was an issue in the Metallgesellschaft and LTCM cases, not Barings.

82. Answer: A

Standards 3.1 and 3.2 relate to the preservation of confidentiality. The simplest, most conservative, and most effective way to comply with these Standards is to avoid disclosing any information received from a client, except to authorized fellow employees who are also working for the client. If the information concerns illegal activities by MTEX, Black may be obligated to report activities to authorities.

83. Answer: C

Buying a call (put) option with a low strike price, buying another call (put) option with a higher strike price, and selling two call (put) options with a strike price halfway between the low and high strike options will generate the butterfly payment pattern. Two other wrong answer choices deal with bull and bear spreads, which can also be replicated with either calls or puts. A bull spread involves purchasing a call (put) option with a low strike price and selling a call (put) option with a higher exercise price. A bear spread is the exact opposite of the bull spread.

84. Answer: C

A stack is a bundle of futures contracts with the same expiration. Over time, a firm may acquire stacks with various expiry dates. To hedge a long-term risk exposure, a firm would close out each stack as it approaches expiry and enter into a contract with a more distant delivery, known as a roll. This strategy is called a stack-and-roll hedge and is designed to hedge long-term risk exposures with short-term contracts. Using short-term futures contracts with a larger notional value than the long-term risk they are meant to hedge could result in over hedging" depending on the hedge ratio.

85. Answer: C

All else equal, convexity increase for longer maturities, lower coupons, and lower yields.

Bonds with embedded options (e.g., callable bonds) exhibit negative convexity over certain ranges of yields while straight bonds with no embedded options exhibit positive convexity over the entire range of yields.

86. Answer: C

The difference of the differences is (12% -10%) - [LIBOR + 1% — (LIBOR + 0.5%)] =1.5%.

87. Answer: B

When forward prices are as a discount to spot prices, a backwardation market is said to exist. The relatively high spot price represents a convenience yield to the consumer that holds the commodity for immediate consumption.

88. Answer: D

Fabozzi: "One important risk is eliminated in a zero-coupon investment—the reinvestment risk. Because there is no coupon to reinvest, there isn't any reinvestment risk. Of course, although this is beneficial in declining-interest-rate markets, the reverse is true when interest rates are rising. The investor will not be able to reinvest an income stream at rising reinvestment rates. The lower the rates are, the more likely it is that they will rise again, making a zero-coupon investment worth less in the eyes of potential holders."

89. Answer: B

The relationship still applies.

90. Answer: B

Probability of zero defaults = 97%^3 = 91.26% and probability of exactly one default (binomial) = nCk*p^k*(1-p)^(n-k) = 3*3%^1*97%^2 = 8.468%, s.t. cumulative Prob [zero or one default] is 99.74%. Both the 95% VaR and 99% VaR are one default.

PD, single bond			3.0%
Face per bond			100

# Bonds Default(d)	binomial pdf	binomial CDF	Loss(L)
0	91.2673%	**91.2673%**	$0.00
1	8.4681%	**99.7354%**	$100.00
2	0.2619%	**99.9973%**	$200.00
3	0.0027%	**100.0000%**	$300.00
sum	100.00%		

91. Answer: A.

The 10% loss tail includes 5% of no loss (i.e., the 90% to 95% CDF) and 5% of the loss event. The average of this 10% tail is therefore given by:

50% * 0 + 50%*[E(loss|loss event)] = 50% * [20%*10 + 50%*18 + 30%*25] = $9.25 million

92. Answer: C

More than $56,000, as $56,000 is the EL under independence between PD and LGD.

Typically, we do assume independence between PD and LGD such that EL = AE*PD*LGD. In which case, the problem is straightforward:

Adjusted exposure (AE) = $6 million OS + ($4 million unused COM * 50% UGD) = $8 million.

EL (assuming independence between PD & LGD) = $8 million * 1.0% PD * 70% LGD = $56,000.

However, with positive correlation the EL must be greater.

93. Answer：C

Unexpected loss (%) = SQRT[EDF * variance(LGD) + LGD^2 * variance(EDF)] = SQRT[4%*25%^2 + 50%^2*4%*96%] = 11.00%

Expected loss (%) = EDF*LGD = 4%*50% = 2.0%.

Ratio of UL/EL = 11.0%/2.0% = 5.50

94. Answer: D

All three (high liquidity favored the stack; the stack has greater basis risk; the shift to contango caused dramatic roll return losses and associated, substantial margin calls).

95. Answer: C

Use interest-rate parity to solve this problem.

1.1565=S×e(0.02-0.04)/0.25，so S=1.1623.

96. Answer: A

Option-free bonds have positive convexity and the effect of (positive) convexity is to increase the magnitude of the price increase when yield fall and to decrease the magnitude of the price decrease when yields rise.

97. Answer: A

	Mountain West	**First Interstate**	**Glacier Bank**	**Totals**
EUR Assets	1,350,000	500,000	875,000	2,275,000
EUR Liabilities	2,000,000	400,000	1,550,000	3,950,000
EUR Bought	275,000	150,000	2,450,000	2,875,000
EUR Sold	650,000	375,000	1,875,000	2,900,000

The region's net euro exposure is computed as follows:

(EUR Assets- EUR Liabilities)+ (EUR Bought- EUR Sold)

= (2,275,000-3,950,000) + (2,875,000-2, 900, 000) =-EUR 1,250,000

The banks, collectively, have a negative net exposure. A negative net exposure position means that the region is net short in a currency. The region faces the risk that the euro will rise in value against the domestic currency.

98. Answer: D

308.3. D. TRUE: Among the class of unbiased estimators that are linear, T(.) has the smallest variance. To be "best" is to be efficient, and to be efficient is to be the estimator with the lowest variance among unbiased estimators. BLUE adds the linearity requirement, such that BLUE is the minimum variance among the linear estimators that are unbiased.

In regard to (A), this is false (not necessarily true) because an biased estimator can have a smaller variance.

In regard to (B), this is false (not necessarily true) because another unbiased estimator can be more efficient than T(.) due to a smaller variance, yet not be non-linear; i.e., within the class of unbiased estimators, there can be a smallest variance among both linear and non-linear estimators.

In regard to (C), this is false because the MLE estimator of variance is biased; dividing by (n) instead of (n-1) gives us a sample variance estimator that is unbiased (although its square root is strangely not unbiased). With respect to sample variance, our choice is to divide by (n) for the biased MLE or divide by (n-1) for the unbiased estimator. Also, please note this is not BLUE due to non-linearity.

99. Answer: C

A distribution that has a greater percentage of small deviations from the mean and a greater percentage of extremely large deviations from the mean will be leptokurtic and will exhibit excess kurtosis (positive). The distribution will be taller and have fatter tails than a normal distribution.

100. Answer: C