Fixed Income

【题干】Jules Bianchi is a bond analyst for Maneval Investments, lnc. Bianchi gathers data on three corporate bonds, as shown in Exhibit 1.

Exibit 1. Selected Bond Data

Issuer	Coupon Rate	Price	Bond Description
Ayrault, lnc. (AI)	5.25%	100.200	Callable at par in one year years from today
Blum, lnc. (BI)	5.25%	101.300	Option-free
Cresson Enterprises (CE)	5.25%	102.100	Putable at par in one yea today

*Note:* Each bond has a remaining maturity of three years, annual coupon payments credit rating of BBB.

To assess the interest rate risk of the three bonds, Bianchi constructs two binomial interest rate trees based on a 10% interest rate volatility assumption and a current one-year rate of 1%. Panel A of Exhibit 2 provides an interest rate tree assuming the benchmark yield curve shifts down by 30 bps, and Panel B provides an interest rate tree assuming the benchmark yield curve shifts up by 30 bps. Bianchi determines that the AI bond is currently trading at an option-adjusted spread (OAS) of 13.95 bps relative to the benchmark yield curve.

Armand Gillette, a convertible bond analyst, stops by Bianchi's office to discuss two convertible bonds. One is issued by DeLille Enterprises (DE) and the other is issued by Raffarin Incorporated (RI). Selected data for the two bonds are presented in Exhibits 3 and 4.

Exhibit 2. Binomial Interest Rate Trees

Panel A Interest Rates Shift Down by 30 bps

Year 0	Year 1	Year2

		7.0037%
	5.1968%	
3.7000%		5.7342%
	4.2548%	
		4.6947%
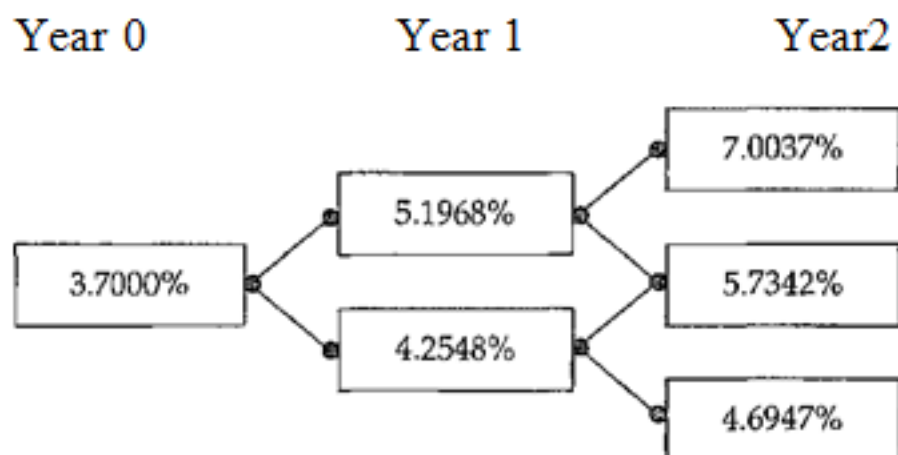
Panel B Interest Rates Shift Up by 30 bps

Year 0	Year 1	Year 2

		7.7432%
	5.8605%	
4.3000%		6.3396%
	4.7982%	
		5.1904%
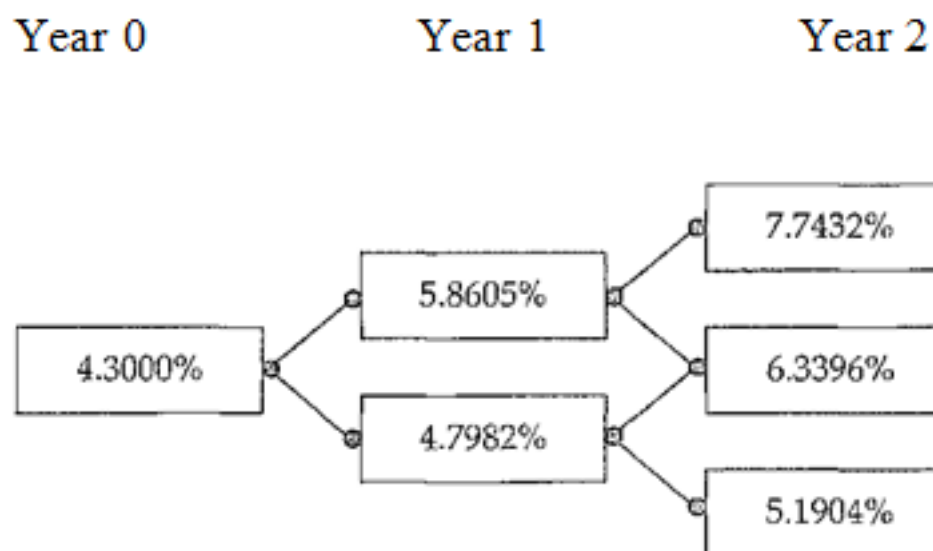
Exhibit 3 Selected Data for DE Convertible Bond

Issue price	€1,000 at par
Conversion period	13 September 20X5 12 September 20X8
Initial conversion price	€10.00 per share
Threshold dividend	€0.50 per share
Change of control conversion price	€8.00 per share
Common stock share price on issue date	€8.70
Share price on 17 September 20X5	€9.10
Convertible bond price on 17 September 20X5	€1,123

Exhibit 4 Selected Data for RI Convertible Bond

Straight bond value	€978
Value of embedded issuer call option	€43
Value of embedded investor put option	€26
Value of embedded call option on issuer's stock	€147
Conversion price	€12.50
Current common stock share price	€11.75

Gillette makes the following comments to Bianchi:■ "The DE bond does not contain any call or put options but the RI bond contains both an embedded call option and put option. I expect that DeLille Enterprises will soon announce a common stock dividend of €0.70 per share." ■ "My belief is that, over the next year, Raffarin's share price will appreciate toward the conversion price but not exceed it."

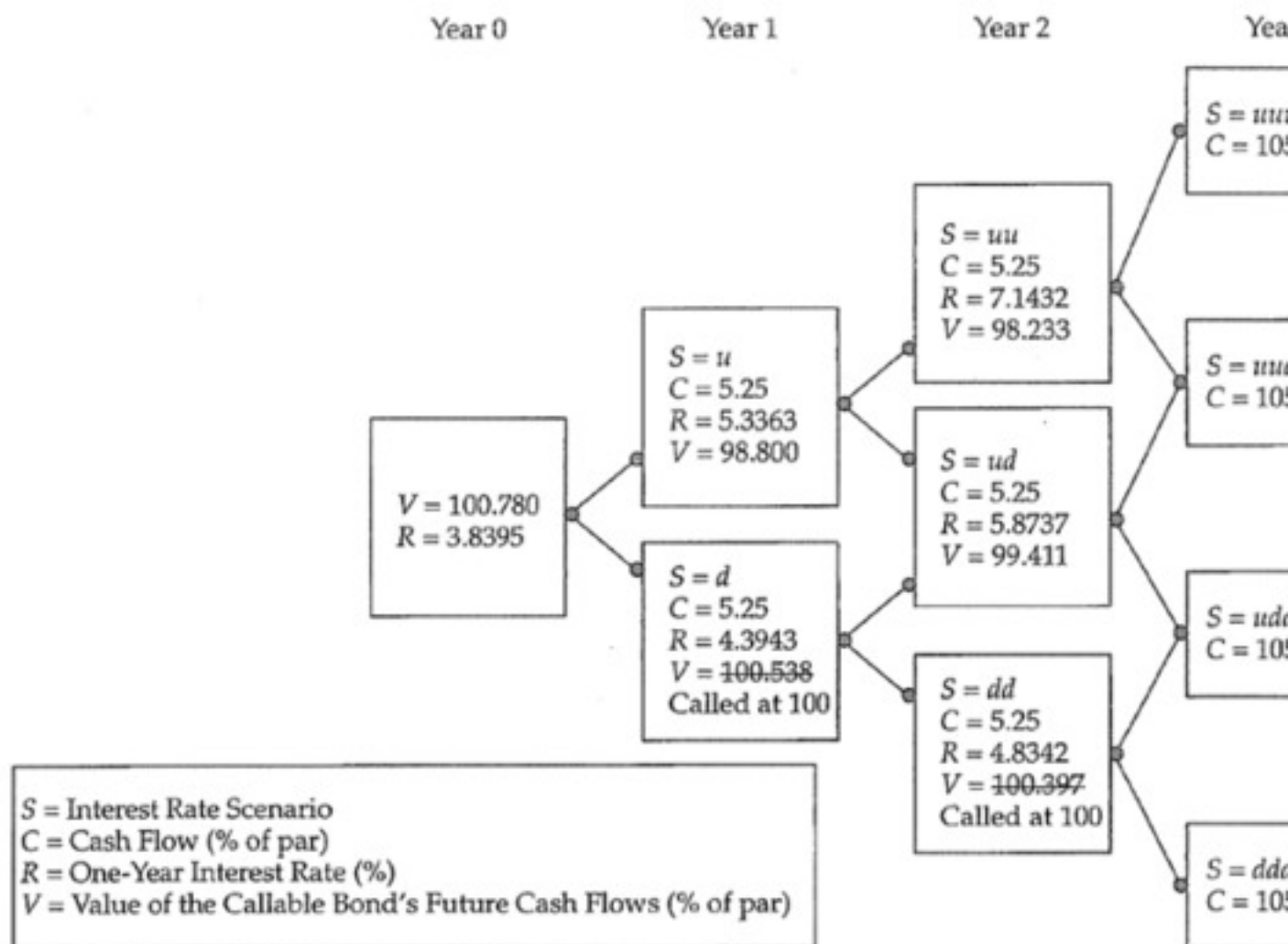1.【单项选择题】Based on Exhibits 1 and 2, the effective duration for the AI bond is closest to:

A. 1.98

B. 2.15

C. 2.73

参考答案：B

【莽学解析】The AI bond's value if interest rates shift down by 30 bps (PV–) is 100.78:

The AI bond's value if interest rates shift up by 30 bps (PV+) is 99.487:

$$\text{EffDur} = \frac{(PV_-) - (PV_+)}{2 \times (\Delta \text{Curve}) \times (PV_0)} = \frac{100.780 - 99.487}{2 \times 0.003 \times 100.200} = 2.15.$$

2.【单项选择题】If benchmark yields were to fall, which bond in Exhibit 1 would most likely experience a decline in effective duration?
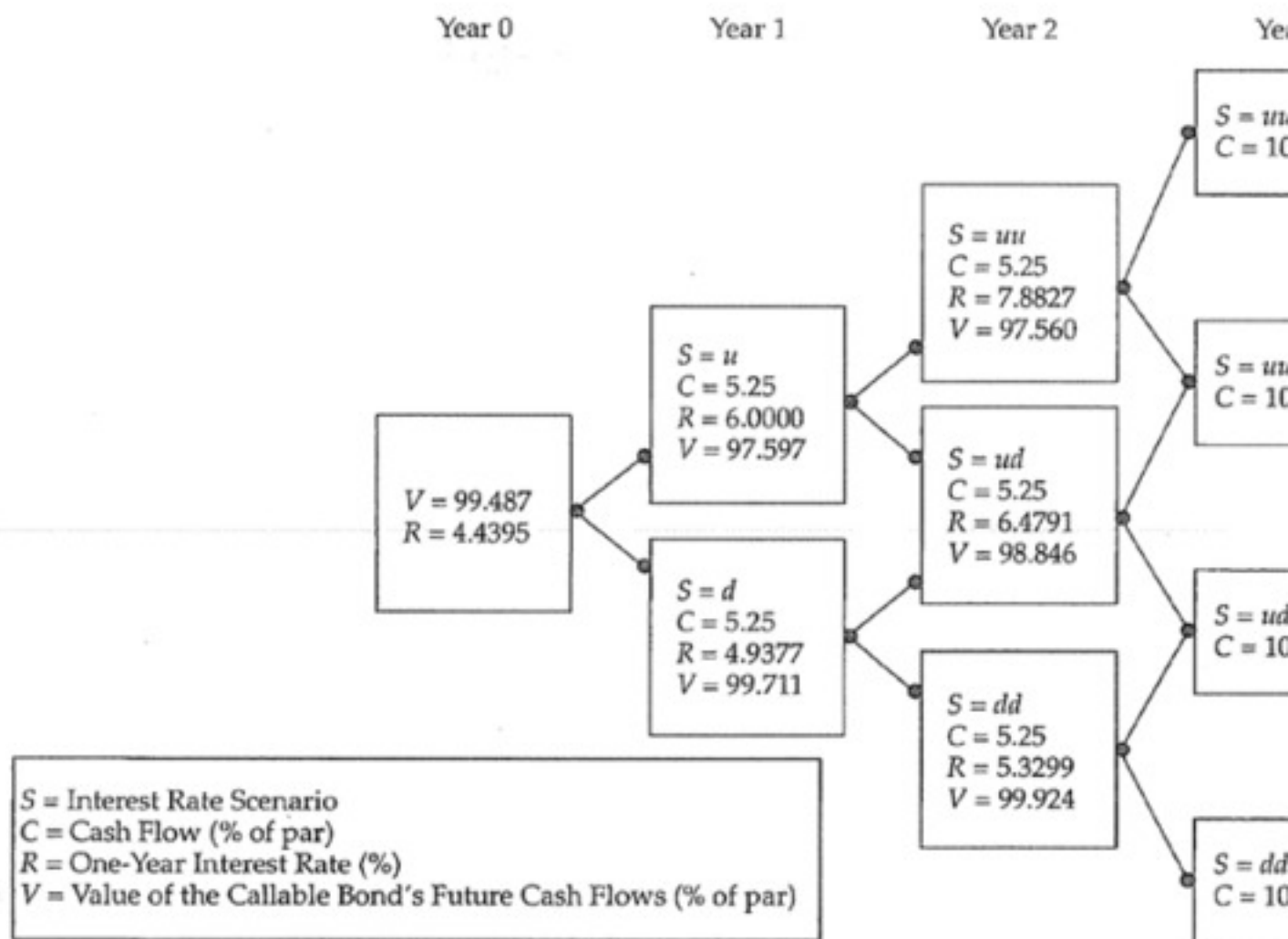
A. AI bond

B. BI bond

C. CE bond

参考答案：A

【莽学解析】The AI bond is a callable bond and the effective duration of a callable bond

S = Interest Rate Scenario
C = Cash Flow (% of par)
R = One-Year Interest Rate (%)
V = Value of the Callable Bond's Future Cash Flows (% of par)

decreases when interest rates fall. The reason is because a decline in interest rates may result in the call option moving into the money, which limits the price appreciation of the callable bond. Exhibit 1 also shows that the price of the Al bond is 100.200 and that it is callable at par in one year and two years. Thus, the call option is already in the money and would likely be exercised in response to increases in the Al bond's price.

3.【单项选择题】Based on Exhibit 1, for the BI bond, one-sided:
A. up-duration will be greater that one-sided down-duration.
B. down-duration will be greater than one-sided up-duration.
C. up-duration and one-sided down-duration will be about equal.
参考答案：C
【莽学解析】The BI bond is an option-free bond and one-sided up-duration and one-sided down-duration will be about equal for option-free bonds.

4.【单项选择题】Based on Exhibit 1, which key rate duration is the largest for the BI bond?
A. One-year key rate duration
B. Two-year key rate duration
C. Three-year key rate duration
参考答案：C
【莽学解析】The BI bond is an option-free bond. Its longest key rate duration will be in the

year of its maturity because the largest cash flow (payment of both coupon and principal) occurs in that year.

5.【单项选择题】Which bond in Exhibit 1 most likely has the lowest effective convexity?

A. AI bond

B. BI bond

C. CE bond

参考答案：A

【莽学解析】All else being equal, a callable bond will have lower effective convexity than an option-free bond when the call option is in the money. Similarly, when the call option is in the money, a callable bond will also have lower effective convexity than a putable bond if the put option is out of the money. Exhibit 1 shows that the callable Al bond is currently priced slightly higher than its call price of par value, which means the embedded call option is in the money. The put option embedded in the CE bond is not in the money; the bond is currently priced 2.1% above par value. Thus, at the current price, the putable CE bond is more likely to behave like the option-free BI bond. Consequently, the effective convexity of the AI bond will likely be lower than the option-free BI bond and the putable CE bond.

6.【单项选择题】Based on Exhibit 3, if DeLille Enterprises pays the dividend expected by Gillette, the conversion price of the DE bond will:

A. be adjusted downward

B. not be adjusted.

C. be adjusted upward.

参考答案：A

【莽学解析】The conversion price would be adjusted downward because Gillette's expected dividend payment of €0.70 is greater than the threshold dividend of €0.50.

7.【单项选择题】Based on Exhibit 3, the market conversion premium per share for the DE bond on 17 September 20X5 is closest to:

A. €0.90.

B. €2.13.

C. €2.53.

参考答案：B

【莽学解析】The market conversion premium per share is equal to the market conversion price minus the underlying share price. =The market conversion price is calculated as follows:Market conversion price = Convertible bond / Conversion ratio = €1,123 / €1,000/€10 per share = €11.23 per shareThe market conversion premium per share is then calculated as follows:Market conversion premium per share = Market conversion price - Underlying share price = €1123 一 €9.10 = €2.13

8.【单项选择题】Based on Exhibit 4, the arbitrage-free value of the RI bond is closest to:

A. €814.

B. €1,056.

C. €1,108.

参考答案：C

【莽学解析】The value of a convertible bond with both an embedded call option and a put option can be determined using the following formula:Value of callable putable convertible bond= Value of straight bond + Value of call option on the issuer's stock – Value of issuer call option + Value of investor put option.Value of callable putable bond = €978 + €147 – €43 + €26 = €1,108

9.【单项选择题】Based on Exhibit 4 and Gillette's forecast regarding Raffarin's share price, the return on the RI bond over the next year is most likely to be:

A. lower than the return on Raffarin's common shares.

B. the same as the return on Raffarin's common shares.

C. higher than the return on Raffarin's common shares.

参考答案：A

【莽学解析】Over the next year, Gillette believes that Raffarin's share price will continue to increase towards the conversion price but not exceed it. If Gillette's forecast becomes true, the return on the RI bond will increase but at a lower rate than the increase in Raffarin's share price because the conversion price is not expected to be reached.

【题干】John Smith, a fixed-income portfolio manager at a €10 billion sovereign wealth fund (the Fund), meets with Sofia Chan, a derivatives strategist with Shire Gate Securities (SGS), to discuss investment opportunities for the Fund. Chan notes that SGS adheres to ISDA (International Swaps and Derivatives Association) protocols for credit default swap (CDS) transactions and that any contract must conform to ISDA specifications. Before the Fund can engage in trading CDS products with SGS, the Fund must satisfy compliance requirements.

Smith explains to Chan that fixed-income derivatives strategies are being contemplated for both hedging and trading purposes. Given the size and diversified nature of the Fund, Smith asks Chan to recommend a type of CDS that would allow the Fund to simultaneously fully hedge multiple fixed-income exposures.

Smith and Chan discuss opportunities to add trading profits to the Fund. Smith asks Chan to determine the probability of default associated with a five-year investment-grade bond issued by Orion Industrial. Selected data on the Orion Industrial bond are presented in Exhibit 1.

Chan explains that a single-name CDS can also be used to add profit to the Fund over time. Chan describes a hypothetical trade in which the Fund sells £6 million of five-year CDS protection on Orion, where the CDS contract has a duration of 3.9 years. Chan assumes that the Fund closes the position six months later, after Orion's credit spread narrowed from 150 bps to 100 bps.

Chan discusses the mechanics of a long/short trade. In order to structure a number of potential trades, Chan and Smith exchange their respective views on individual companies and global economies. Chan and Smith agree on the following outlooks.

Outlook 1: The European economy will weaken.

Outlook 2: The US economy will strengthen relative to that of Canada.

Outlook 3: The credit quality of electric car manufacturers will improve relative to that of traditional car manufacturers.

Chan believes US macroeconomic data are improving and that the general economy will strengthen in the short term. Chan suggests that a curve trade could be used by the Fund to capitalize on her short-term view of a steepening of the US credit curve.

Another short-term trading opportunity that Smith and Chan discuss involves the merger and

Exhibit 1. Selected Data on Orion Industrial Five-Year Bon

Year	Hazard Rate
1	0.22%
2	0.35%
3	0.50%
4	0.65%
5	0.80%

acquisition market. SGS believes that Delta Corporation may make an unsolicited bid at a premium to the market price for all of the publicly traded shares of Zega, Inc. Zega's market capitalization and capital structure are comparable to Delta's; both firms are highly levered. It is anticipated that Delta will issue new equity along with 5- and 10-year senior unsecured debt to fund the acquisition, which will significantly increase its debt ratio.

10. 【单项选择题】To satisfy the compliance requirements referenced by Chan, the fund is most likely required to:
A. set a notional amount.
B. post an upfront payment.
C. sign an ISDA master agreement.
参考答案：C
【莽学解析】Parties to CDS contracts generally agree that their contracts will conform to ISDA specifications. These terms are specified in the ISDA master agreement, which the parties to a CDS sign before any transactions are made. Therefore, to satisfy the compliance requirements referenced by Chan, the sovereign wealth fund must sign an ISDA master agreement with SGS.

11. 【单项选择题】Which type of CDS should Chan recommend to Smith?
A. CDS index
B. Tranche CDS
C. Single-name CDS
参考答案：A
【莽学解析】A CDS index (e.g., CDX and iTraxx) would allow the Fund to simultaneously fully hedge multiple fixed-income exposures. A tranche CDS will also hedge multiple exposures, but it would only partially hedge those exposures.

12. 【单项选择题】Based on Exhibit 1, the probability of Orion defaulting on the bond during the first three years is closest to:
A. 1.07%.

B. 2.50%.

C. 3.85%.

参考答案：A

【莽学解析】Based on Exhibit 1, the probability of survival for the first year is 99.78% (100% minus the 0.22% hazard rate). Similarly, the probability of survival for the second and third years is 99.65% (100% minus the 0.35% hazard rate) and 99.50% (100% minus the 0.50% hazard rate), respectively. Therefore, the probability of survival of the Orion bond through the first three years is equal to 0.9978 × 0.9965 × 0.9950 = 0.9893, and the probability of default sometime during the first three years is 1 – 0.9893, or 1.07%.

13.【单项选择题】To close the position on the hypothetical Orion trade, the Fund:

A. sells protection at a higher premium than it paid at the start of the trade.

B. buys protection at a lower premium than it received at the start of the trade.

C. buys protection at a higher premium than it received at the start of the trade.

参考答案：B

【莽学解析】The trade assumes that £6 million of five-year CDS protection on Orion is initially sold, so the Fund received the premium. Because the credit spread of the Orion CDS narrowed from 150 bps to 100 bps, the CDS position will realize a financial gain. This financial gain is equal to the difference between the upfront premium received on the original CDS position and the upfront premium to be paid on a new, offsetting CDS position. To close the position and monetize this gain, the Fund should unwind the position by buying protection for a lower premium (relative to the original premium collected).

14.【单项选择题】The hypothetical Orion trade generated an approximate:

A. loss of £117,000.

B. gain of £117,000.

C. gain of £234,000.

参考答案：B

【莽学解析】The gain on the hypothetical Orion trade is £117,000, calculated as follows.

Approximate profit = Change in credit spread (in bps) x Duration x Notional amount

Approximate profit = (150 bps – 100 bps) x 3.9 x £6 million.

Approximate profit = 0.005 x 3.9 x £6 million = £117,000

The Fund gains because it sold protection at a spread of 150 bps and closed out the position by buying protection at a lower spread of 100 bps.

15.【单项选择题】Based on the three economic outlook statements, a profitable long/short trade would be to:

A. sell protection using a Canadian CDX IG and buy protection using a US CDX IG.

B. buy protection using an iTraxx Crossover and sell protection using an iTraxx Main.

C. buy protection using an electric car CDS and sell protection using a traditional car CDS.

参考答案：B

【莽学解析】Based on Outlook 1, Chan and Smith anticipate that Europe's economy will weaken. In order to profit from this forecast, one would buy protection using a high-yield CDS index (e.g., iTraxx Crossover) and sell protection using an investment-grade CDS index (e.g., iTraxx Main).

16.【单项选择题】The curve trade that would best capitalize on Chan's view of the US credit curve is to:

A. buy protection using a 20-year CDX and buy protection using a 2-year CDX.

B. buy protection using a 20-year CDX and sell protection using a 2-year CDX.

C. sell protection using a 20-year CDX and buy protection using a 2-year CDX.

参考答案：B

【莽学解析】To take advantage of Chan's view of the US credit curve steepening in the short term, a curve trade will entail shorting (buying protection using) a long-term (20-year) CDX and going long (selling protection using) a short-term (2-year) CDX. A steeper curve means that long-term credit risk increases relative to short-term credit risk.

17.【单项选择题】A profitable equity-versus-credit trade involving Delta and Zega is to:

A. short Zega shares and buy protection on Delta using the 10-year CDS.

B. go long Zega shares and buy protection on Delta using 5-year CDS.

C. go long Delta shares and buy protection on Delta using 5-year CDS.

参考答案：B

【莽学解析】The shares of Zega can be sold at a higher price as a result of the unsolicited bid in the market. If Delta Corporation issues significantly more debt, there is a higher probability that it may default. If the Fund sells protection on Delta now, the trade will realize a profit as credit spreads widen. An equity-versus-credit trade would be to go long (buy) the Zega shares and buy protection on Delta.

【题干】A one-year zero-coupon bond yields 4.0%. The two- and three-year zero-coupon bonds yield 5.0% and 6.0% respectively.

18.【单项选择题】The rate for a one-year loan beginning in one year is closest to:

A. 4.5%.

B. 5.0%.

C. 6.0%.

参考答案：C

【莽学解析】

From the forward rate model, we have

$$[1 + Z_2]^2 = [1 + Z_1]^1[1 + f_{1,1}]^1$$

Using the one- and two-year spot rates, we have

$$(1 + .05)^2 = (1 + .04)^1[1 + f_{1,1}]^1, \text{ so } \frac{(1+.05)^2}{(1+.04)^1} - 1 = f(1,1) = 6.010\%$$

19.【单项选择题】The forward rate for a two-year loan beginning in one year is closest to:

A. 5.0%

B. 6.0%

C. 7.0%

参考答案：C

【莽学解析】

From the forward rate model,

$$[1 + Z_3]^3 = [1 + Z_1]^1 [1 + f_{1,2}]^2$$

Using the one and three-year spot rates, we find

$$(1 + 0.06)^3 = (1 + 0.04)^1 [1 + f_{1,2}]^2, \text{ so } \sqrt{\frac{(1+0.06)^3}{(1+0.04)^1}} - 1 = f_{1,2} = 7.014\%$$

20.【单项选择题】The forward rate for a one-year loan beginning in two years is closest to:

A. 6.0%

B. 7.0%

C. 8.0%

参考答案：C

【莽学解析】

From the forward rate model,

$$[1 + Z_3]^3 = [1 + Z_2]^2 [1 + f_{2,1}]^1$$

Using the two and three-year spot rates, we find

$$(1 + 0.06)^3 = (1 + 0.05)^2 [1 + f_{2,1}]^1, \text{ so } \frac{(1+0.06)^3}{(1+0.05)^2} - 1 = f_{2,1} = 8.029\%$$

21.【单项选择题】The five-year spot rate is not given above; however, the forward price for a two-year zero-coupon bond beginning in three years is known to be 0.8479. The price today of a five-year zero-coupon bond is closest to:

A. 0.7119.

B. 0.7835.

C. 0.9524.

参考答案：A

【莽学解析】

We can convert spot rates to spot prices to find $DF_3 = \dfrac{1}{(1.06)^3} = 0.839$

model can be used to find the price of the five-year zero as $DF_B = DF_A$

so $DF_5 = DF_3 * F_{3,2} = 0.8396 \times 0.8479 = 0.7119$.

22.【单项选择题】The one-year spot rate $Z_1 = 4\%$, the forward rate for a one-year loan beginning in one year is 6%, and the forward rate for a one-year loan beginning in two years is 8%. Which of the following rates is closest to the three-year spot rate?

A. 4.0%

B. 6.0%

C. 8.0%

参考答案：B

【莽学解析】

Applying the forward rate model, we find

$$[1 + Z_3]^3 = [1 + Z_1]^1 [1 + f_{1,1}]^1 [1 + f_{2,1}]^1$$

So $[1 + Z_3]^3 = (1 + 0.04)^1 (1 + 0.06)^1 (1 + 0.08)^1$, $\sqrt[3]{1.19063} - 1 = Z_3 = 5.$

23.【单项选择题】The one-year spot rate Z_1 is 5% and the forward price for a one-year zero-coupon bond beginning in one year is 0.9346. The spot price of a two-year zero-coupon bond is closest to:

A. 0.87.

B. 0.89.

C. 0.93.

参考答案：B

【莽学解析】

We can convert spot rates to spot prices and use the forward pricing

$\dfrac{1}{(1.05)^1} = 0.9524$. The forward pricing model is $DF_B = DF_A * F_{A, B-A}$, so D

$\times 0.9346 = 0.8901$.

24.【单项选择题】In a typical interest rate swap contract, the swap rate is best described as the interest rate for the:

A. fixed-rate leg of the swap.

B. floating-rate leg of the swap.

C. difference between the fixed and floating legs of the swap.

参考答案：A

【莽学解析】The swap rate is the interest rate for the fixed-rate leg of an interest rate swap.

25.【单项选择题】A two-year fixed-for-floating MRR swap is 1.00%, and the two-year US Treasury bond is yielding 0.63%. The swap spread is closest to:

A. 37 bps.

B. 100 bps.

C. 163 bps.

参考答案：A

【莽学解析】The swap spread = 1.00% - 0.63% = 0.37% or 37 bps.

26.【单项选择题】The swap spread is quoted as 50 bps. If the five-year US Treasury bond is yielding 2%, the rate paid by the fixed payer in a five-year interest rate swap is closest to:

A. 0.50%.

B. 1.50%.

C. 2.50%.

参考答案：C

【莽学解析】The fixed leg of the five-year fixed-for-floating swap will be equal to the five-year Treasury rate plus the swap spread: 2%＋0.5% = 2.5%.

27.【单项选择题】If the three-month T-bill rate drops and the Libor rate remains the same, the relevant TED spread:

A. increases.

B. decreases.

C. does not change.

参考答案：A

【莽学解析】The TED spread is the difference between the three-month Libor rate and the three-month Treasury bill rate. If the T-bill rate falls and Libor does not change, the TED spread will increase.

28.【单项选择题】Given the yield curve for US Treasury zero-coupon bonds, which spread is most helpful pricing a corporate bond? The:

A. Z-Spread.

B. TED spread.

C. Libor－OIS spread.

参考答案：A

【莽学解析】The Z-spread is the single rate which, when added to the rates of the spot yield curve, will provide the correct discount rates to price a particular risky bond.

【题干】Rayes Investment Advisers specializes in fixed-income portfolio management. Meg Rayes, the owner of the firm, would like to add bonds with embedded options to the firm's bond portfolio. Rayes has asked Mingfang Hsu, one of the firm's analysts, to assist her in selecting and analyzing bonds for possible inclusion in the firm's bond portfolio.Hsu first selects two

corporate bonds that are callable at par and have the same characteristics in terms of maturity, credit quality and call dates. Hsu uses the option adjusted spread (OAS) approach to analyse the bonds, assuming an interest rate volatility of 10%. The results of his analysis are presented in Exhibit 1.

Exhibit 1. Summary Results of Hsu's Analysis Using the OAS Approa

Bond	OAS (in bps)
Bond #1	25.5
Bond #2	30.3

Hsu then selects the four bonds issued by RW, Inc. given in Exhibit 2. These bonds all have a maturity of three years and the same credit rating. Bonds #4 and #5 are identical to Bond #3, an option-free bond, except that they each include an embedded option.

Exhibit 2. Bonds Issued by RW, Inc.

Bond	Coupon	Special Provision
Bond #3	4.00% annual	
Bond #4	4.00% annual	Callable at par at the end of years
Bond #5	4.00% annual	Putable at par at the end of years 1
Bond #6	One-year Libor annually, set in arrears	

To value and analyze RW's bonds, Hsu uses an estimated interest rate volatility of 15% and constructs the binomial interest rate tree provided in Exhibit 3.
Rayes asks Hsu to determine the sensitivity of Bond #4's price to a 20 bps parallel shift of the benchmark yield curve. The results of Hsu's calculations are shown in Exhibit 4.

Exhibit 4. Summary Results of Hsu's Analysis about the Sensitivity of Bond #4's P a Parallel Shift of the Benchmark Yield Curve

Magnitude of the Parallel Shift in the Benchmark Yield Curve	+20 bps	–2
Full Price of Bond #4 (% of par)	100.478	10

Hsu also selects the two floating-rate bonds issued by Varlep, plc given in Exhibit 5. These bonds have a maturity of three years and the same credit rating.

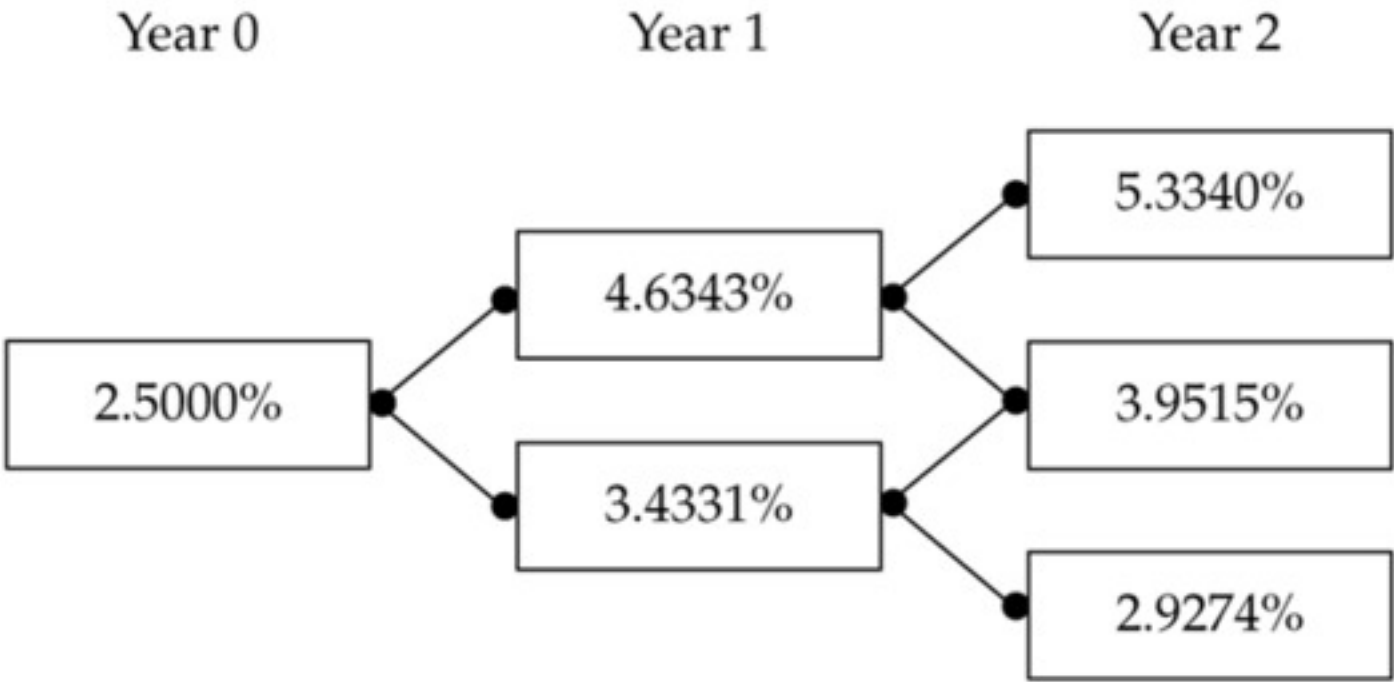## Exhibit 3. Binomial Interest Rate Tree Used to Value RW's Bonds

Year 0	Year 1	Year 2
		5.3340%
	4.6343%	
2.5000%		3.9515%
	3.4331%	
		2.9274%

Exhibit 5. Floating-Rate Bonds Issued by Varlep, plc

| Bond	Coupon
Bond #7	One-year Libor annually, set in arrears, capped at 5.00%
Bond #8	One-year Libor annually, set in arrears, floored at 3.50%

To value Varlep's bonds, Hsu constructs the binomial interest rate tree provided in Exhibit 6. Last, Hsu selects the two bonds issued by Whorton, Inc. given in Exhibit 7. These bonds are close to their maturity date and are identical, except that Bond #9 includes a conversion option. Whorton's common stock is currently trading at $30 per share.

Exhibit 7. Bonds Issued by Whorton, Inc.

Bond	Type of Bond
Bond #9	Convertible bond with a conversion price of $50
Bond #10	Identical to Bond #9 except that it does not include a conversion

29.【单项选择题】Based on Exhibit 1, Rayes would most likely conclude that relative to Bond #1,

Exhibit 6. Binomial Interest Rate Tree Used to Value Varlep's Bonds
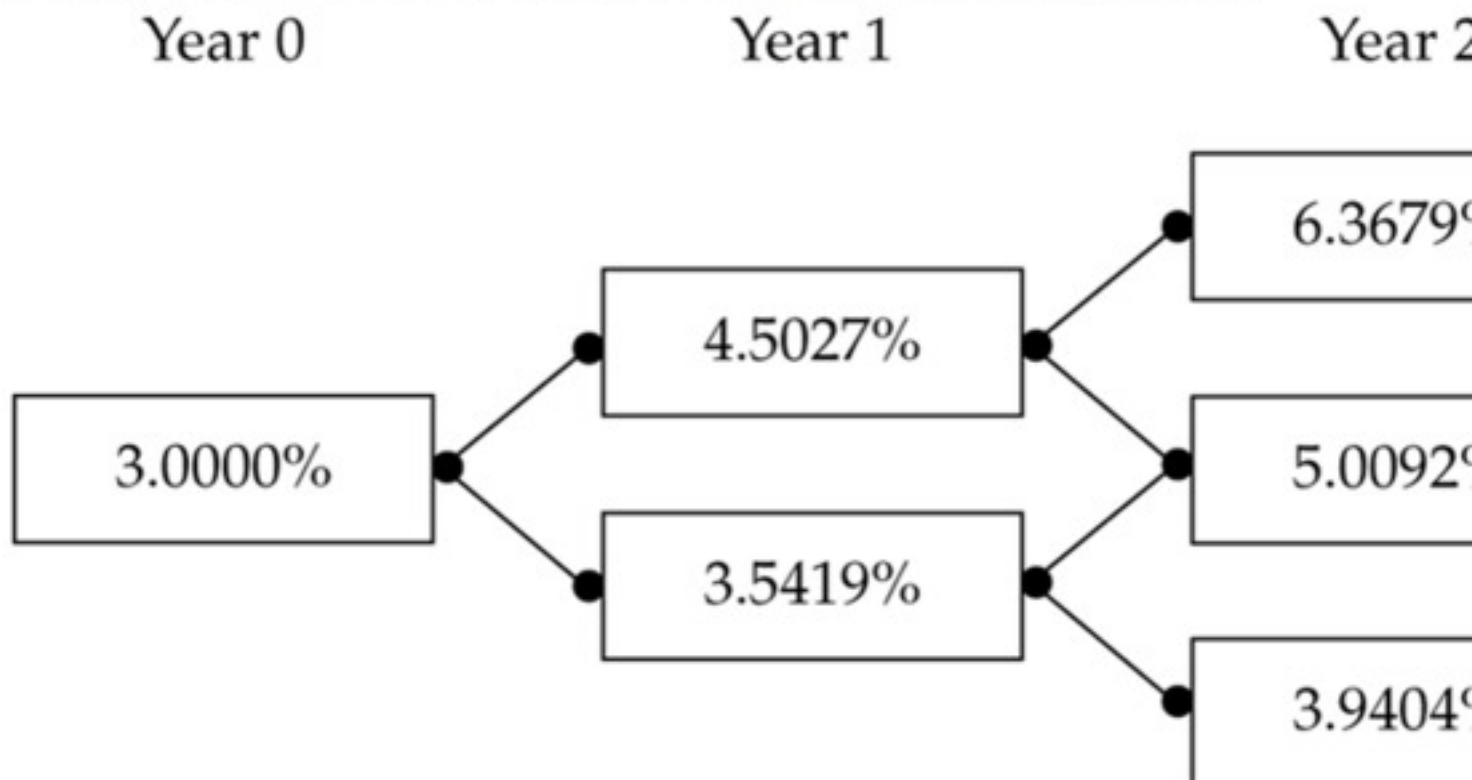
Bond #2 is:

A. overpriced.

B. fairly priced.

C. underpriced.

参考答案：C

【莽学解析】The option-adjusted spread (OAS) is the constant spread added to all the one-period forward rates that makes the arbitrage-free value of a risky bond equal to its market price. The OAS approach is often used to assess bond relative values. If two bonds have the same characteristics and credit quality, they should have the same OAS. If this is not the case, the bond with the largest OAS (i.e., Bond #2) is likely to be underpriced (cheap) relative to the bond with the smallest OAS (Bond #1).

30.【单项选择题】The effective duration of Bond #6 is:

A. close to 1.

B. higher than 1 but lower than 3.

C. higher than 3.

参考答案：A

【莽学解析】The effective duration of a floating-rate bond is close to the time to next reset. As the reset for Bond #6 is annual, the effective duration of this bond is close to 1.

31.【单项选择题】In Exhibit 2, the bond whose effective duration will lengthen if interest rates rise is:

A. Bond #3.

B. Bond #4.

C. Bond #5.

参考答案：B

【莽学解析】Effective duration indicates the sensitivity of a bond's price to a 100 bps parallel shift of the benchmark yield curve assuming no change in the bond's credit spread. The effective duration of an option-free bond such as Bond #3 changes very little in response to interest rate movements. As interest rates rise, a call option moves out of the money, which increases the value of the callable bond and lengthens its effective duration. In contrast, as interest rates rise, a put option moves into the money, which limits the price depreciation of the putable bond and shortens its effective duration. Thus, the bond whose effective duration will lengthen if interest rates rise is the callable bond, i.e., Bond #4.

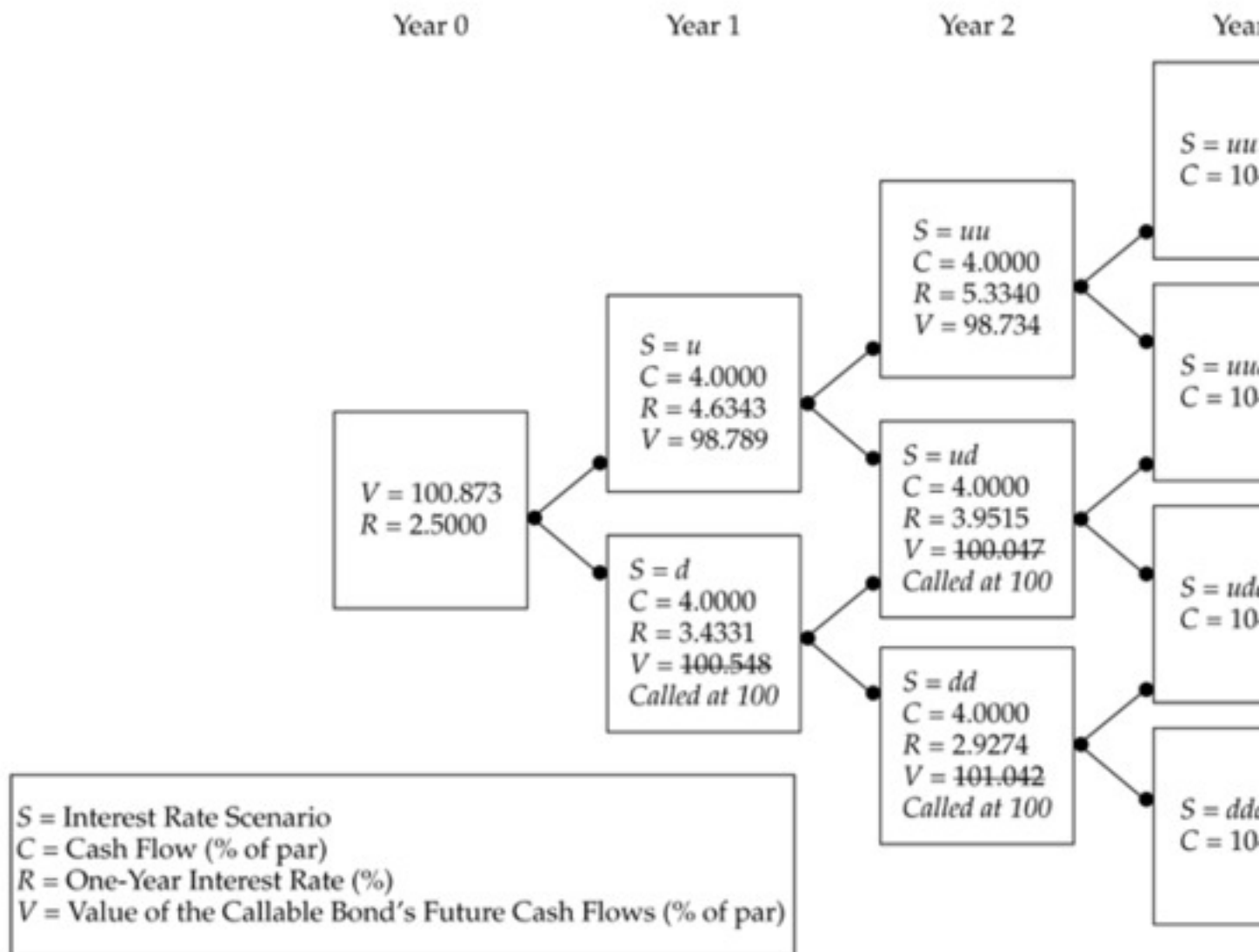32.【单项选择题】The effective duration of Bond #4 is closest to:

A. 0.76.

B. 1.88.

C. 3.77.

参考答案：B

【莽学解析】The effective duration of Bond #4 can be calculated using Equation 3 from the reading, where Δ Curve is 20 bps, PV_- is 101.238, and PV_+ is 100.478. PV_0, the current full price of the bond (i.e., with no shift), is not given but it can be calculated using Exhibit 3 as follows:

Thus, the effective duration of Bond #4 is:

$$Effective\ duration = \frac{101.238 - 100.478}{2 \times (0.0020) \times (100.873)} = 1.88$$
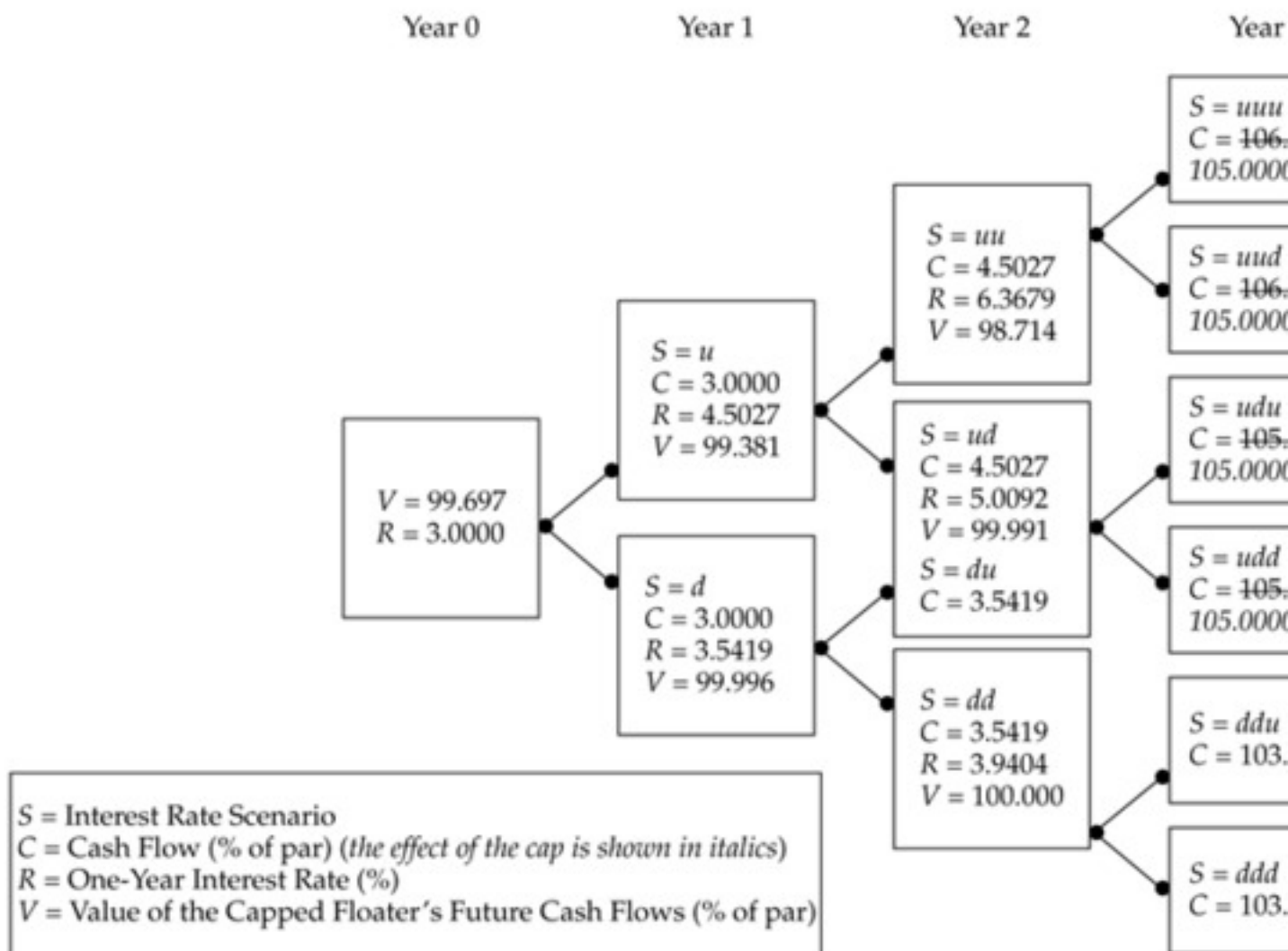
33.【单项选择题】The value of Bond #7 is closest to:

A. 99.697% of par.

B. 99.936% of par.

C. 101.153% of par.

参考答案：A

【莽学解析】

34.【单项选择题】The value of Bond #8 is closest to:

A. 98.116% of par.
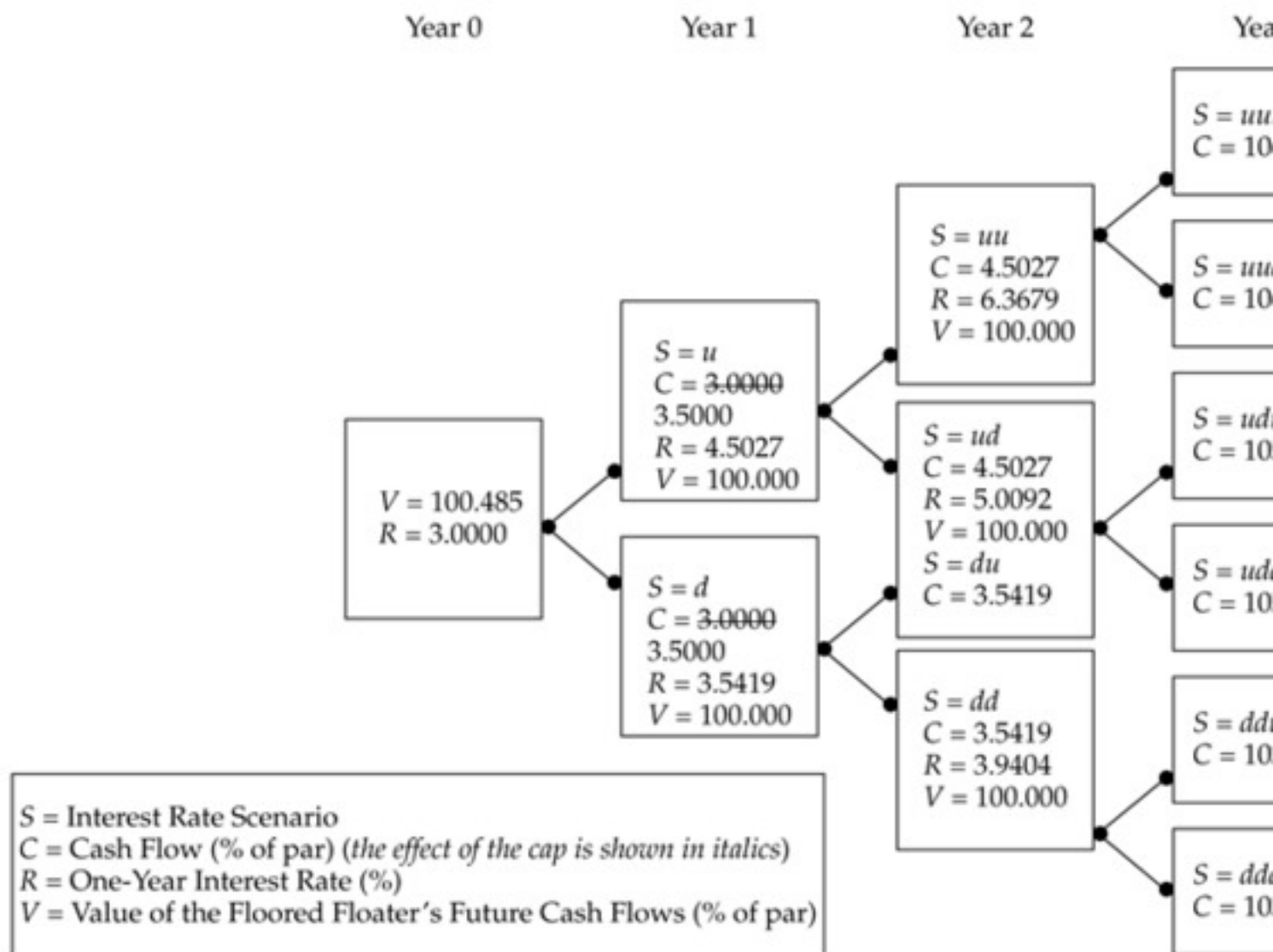
B. 100.000% of par.

C. 100.485% of par.

参考答案：C

【莽学解析】

Year 0　　　　Year 1　　　　Year 2　　　　Year...

S = uu
C = 4.5027
R = 6.3679
V = 100.000

S = uu...
C = 10...

S = uu...
C = 10...

S = u
C = ~~3.0000~~
3.5000
R = 4.5027
V = 100.000

S = ud
C = 4.5027
R = 5.0092
V = 100.000
S = du
C = 3.5419

S = udi...
C = 10...

V = 100.485
R = 3.0000

S = ud...
C = 10...

S = d
C = ~~3.0000~~
3.5000
R = 3.5419
V = 100.000

S = dd
C = 3.5419
R = 3.9404
V = 100.000

S = ddi...
C = 10...

S = dd...
C = 10...

S = Interest Rate Scenario
C = Cash Flow (% of par) (the effect of the cap is shown in italics)
R = One-Year Interest Rate (%)
V = Value of the Floored Floater's Future Cash Flows (% of par)

35.【单项选择题】The value of Bond #9 is equal to the value of Bond #10:

A. plus the value of a put option on Whorton's common stock.

B. plus the value of a call option on Whorton's common stock.

C. minus the value of a call option on Whorton's common stock.

参考答案：B

【莽学解析】A convertible bond includes a conversion option, which is a call option on the issuer's common stock. This conversion option gives the bondholders the right to convert their debt into equity. Thus, the value of Bond #9, the convertible bond, is equal to the value of Bond #10, the underlying option-free bond (straight bond), plus the value of a call option on Whorton's common stock.

36.【单项选择题】The minimum value of Bond #9 is equal to the greater of:

A. the conversion value of Bond #9 and the current value of Bond #10.

B. the current value of Bond #10 and a call option on Whorton's common stock.

C. the conversion value of Bond #9 and a call option on Whorton's common stock.

参考答案：A

【莽学解析】The minimum value of a convertible bond is equal to the greater of the conversion value of the convertible bond (i.e., Bond #9) and the current value of the straight bond (i.e., Bond #10).

37.【单项选择题】The factor that is currently least likely to affect the risk-return characteristics of Bond #9 is:

A. Interest rate movements.

B. Whorton's credit spreads.

C. Whorton's common stock price movements.

参考答案：C

【莽学解析】The risk-return characteristics of a convertible bond depend on the market price of the issuer's common stock (underlying share price) relative to the bond's conversion price. When the underlying share price is well below the conversion price, the convertible bond exhibits mostly bond risk-return characteristics. In this case, the price of the convertible bond is mainly affected by interest rate movements and the issuer's credit spreads. In contrast, when the underlying share price is above the conversion price, the convertible bond exhibits mostly stock risk-return characteristics. In this case, the price of the convertible bond is mainly affected by the issuer's common stock price movements. The underlying share price ($30) is lower than the conversion price of Bond #9 ($50). Thus, Bond #9 exhibits mostly bond risk-return characteristics and is least affected by Whorton's common stock price movements.

【题干】Jane Nguyen is a senior bond trader and Christine Alexander is a junior bond trader for an investment bank. Nguyen is responsible for her own trading activities and also for providing assignments to Alexander that will develop her skills and create profitable trade ideas. Exhibit 1 presents the current par and spot rates.

Exhibit 1. Current Par and Spot Rates

Maturity	Par Rate	Spot Rate
One year	2.50%	2.50%
Two years	2.99%	3.00%
Three years	3.48%	3.50%
Four years	3.95%	4.00%
Five years	4.37%	

Note: Par and spot rates are based on annual-coupon sovereign bonds.

Nguyen gives Alexander two assignments that involve researching various questions:Assignment 1: What is the yield to maturity of the option-free, default risk-free bond presented in Exhibit 2? Assume that the bond is held to maturity, and use the rates shown in Exhibit 1.

Exhibit 2. Selected Data for $1,000 Par Bond

Bond Name	Maturity (T)	Coupon
Bond Z	Three years	6.00%

Note: Terms are today for a T-year loan.

Assignment 2: Assuming that the projected spot curve two years from today will be below the current forward curve, is Bond Z fairly valued, undervalued, or overvalued?After completing her assignments, Alexander asks about Nguyen's current trading activities. Nguyen states that she has a two-year investment horizon and will purchase Bond Z as part of a strategy to ride the yield curve. Exhibit 1 shows Nguyen's yield curve assumptions implied by the spot rates.

38.【单项选择题】Based on Exhibit 1, the five-year spot rate is closest to:
A. 4.40%
B. 4.45%
C. 4.50%
参考答案：B
【莽学解析】The five-year spot rate is determined by using forward substitution and using the known values of the one-year, two-year, three-year, and four-year spot rates as follows:

$$1=\frac{0.0437}{(1.025)}+\frac{0.0437}{(1.030)^2}+\frac{0.0437}{(1.035)^3}+\frac{0.0437}{(1.040)^4}+\frac{1+0.0437}{\left[1+r(5)\right]^5}$$

$$r(5)=\sqrt[5]{\frac{1.0437}{0.8394}}-1=4.453\%$$

39.【单项选择题】Based on Exhibit 1, the market is most likely expecting:
A. deflation.
B. inflation.
C. no risk premiums.
参考答案：B
【莽学解析】The spot rates imply an upward-sloping yield curve, $z_3 > z_2 > z_1$. Because nominal yields incorporate a premium for expected inflation, an upward-sloping yield curve is generally interpreted as reflecting a market expectation of increasing, or at least level, future inflation (associated with relatively strong economic growth).

40.【单项选择题】Based on Exhibit 1, the forward rate of a one-year loan beginning in three years is closest to:

A. 4.17%.

B. 4.50%.

C. 5.51%.

参考答案：C

【莽学解析】

A one-year loan beginning in three years, or $f(3,1)$, is calculated as follows:

$$\left[1+r(3+1)\right]^{(3+1)} = \left[1+r(3)\right]^3 \left[1+f(3,1)\right]^1$$

$$\left[1.040\right]^4 = \left[1.035\right]^3 \left[1+f(3,1)\right]^1$$

$$f(3,1) = \frac{(1.04)^4}{(1.035)^3} - 1 = 5.514\%$$

41.【单项选择题】Based on Exhibit 1, which of the following forward rates can be computed?

A. A one-year loan beginning in five years

B. A three-year loan beginning in three years

C. A four-year loan beginning in one year

参考答案：C

【莽学解析】Exhibit 1 provides five years of par rates, from which the spot rates for $r(1)$, $r(2)$, $r(3)$, $r(4)$, and $r(5)$ can be derived. Thus the forward rate $f(1,4)$ can be calculated as follows:

$$f(1,4) = \sqrt[4]{\frac{\left[1+r(5)\right]^5}{\left[1+r(1)\right]}} - 1$$

42.【单项选择题】For Assignment 1, the yield to maturity for Bond Z is closest to the:

A. one-year spot rate.

B. two-year spot rate.

C. three-year spot rate.

参考答案：C

【莽学解析】The yield to maturity, $y(3)$, of Bond Z should be a weighted average of the spot rates used in the valuation of the bond. Because the bond's largest cash flow occurs in Year 3, $r(3)$ will have a greater weight than $r(1)$ and $r(2)$ in determining $y(3)$. Using the spot rates:

Using a calculator, the compute result is $y(3)$ = 3.46%, which is closest to the three-year spot

$$Price = \frac{\$60}{(1.025)^1} + \frac{\$60}{(1.030)^2} + \frac{\$1,060}{(1.035)^3} = \$1,071.16$$

Using the yield to maturity:

$$Price = \frac{\$60}{[1+y(3)]^1} + \frac{\$60}{[1+y(3)]^2} + \frac{\$1,060}{[1+y(3)]^3} = \$1,071.16$$

rate of 3.50%.

43.【单项选择题】For Assignment 2, Alexander should conclude that Bond Z is currently:

A. undervalued.

B. fairly valued.

C. overvalued.

参考答案：A

【莽学解析】Alexander projects that the spot curve two years from today will be below the current forward curve, which implies that her expected future spot rates beyond two years will be lower than the quoted forward rates. Alexander would perceive Bond Z to be undervalued in the sense that the market is effectively discounting the bond's payments at a higher rate than she would and the bond's market price is below her estimate of intrinsic value.

44.【单项选择题】By choosing to buy Bond Z, Nguyen is most likely making which of the following assumptions?

A. Bond Z will be held to maturity.

B. The three-year forward curve is above the spot curve.

C. Future spot rates do not accurately reflect future inflation.

参考答案：B

【莽学解析】Nguyen's strategy is to ride the yield curve, which is appropriate when the yield curve is upward sloping. The yield curve implied by Exhibit 1 is upward sloping, which implies that the three-year forward curve is above the current spot curve. When the yield curve slopes upward, as a bond approaches maturity or "rolls down the yield curve," the bond is valued at successively lower yields and higher prices.

【题干】Betty Tatton is a fixed income analyst with the hedge fund Sailboat Asset Management (SAM). SAM invests in a variety of global fixed-income strategies, including fixed-income arbitrage. Tatton is responsible for pricing individual investments and analyzing market data to assess the opportunity for arbitrage. She uses two methods to value bonds:Method 1: Discount each year's cash flow separately using the appropriate interest rate curve.Method 2: Build and use a binomial interest rate tree.Tatton compiles pricing data for a list of annual pay bonds (Exhibit 1). Each of the bonds will mature in two years, and Tatton considers the bonds as being risk-free; both the one-year and two-year benchmark spot rates are 2%. Tatton calculates the arbitrage-free prices and identifies an arbitrage opportunity to recommend to her team. Next, Tatton uses the benchmark yield curve provided in Exhibit 2 to consider arbitrage

Exhibit 1. Market Data for Selected Bonds

Asset	Coupon	Market Price
Bond A	1%	98.0584
Bond B	3%	100.9641
Bond C	5%	105.8247

opportunities of both option-free corporate bonds and corporate bonds with embedded options. The benchmark bonds in Exhibit 2 pay coupons annually, and the bonds are priced at par.

Exhibit 2. Benchmark Par Curve

Maturity (years)	Yield to Maturity (YTM)
1	3.0%
2	4.0%
3	5.0%

Tatton then identifies three mispriced three-year annual-pay bonds and compiles data on the bonds (see Exhibit 3).

Exhibit 3. Market Data of Annual-Pay Corporate Bonds

Company	Coupon	Market Price	Yield	Embedded Optio
Hutto-Barkley Inc.	3%	94.9984	5.6%	No
Luna y Estrellas Intl.	0%	88.8996	4.0%	Yes
Peaton Scorpio Motors	0%	83.9619	6.0%	No

Lastly, Tatton identifies two mispriced Swiss bonds, Bond X, a three-year bond, and Bond Y, a five-year bond. Both are annual-pay bonds with a coupon rate of 6%. To calculate the bonds' values, Tatton devises the first three years of the interest rate lognormal tree presented in Exhibit 4 using historical interest rate volatility data. Tatton considers how this data would change if implied volatility, which is higher than historical volatility, were used instead.

Exhibit 4. Interest Rate Tree; Forward Rates Based on Swiss Market

Year 1	Year 2	Year 3
	4%	6%
1%		5%
	2%	3%

45.【单项选择题】Based on Exhibit 1, which of the following bonds most likely includes an arbitrage opportunity?

A. Bond A

B. Bond B

C. Bond C

参考答案：B

【莽学解析】Bond B's arbitrage-free price is calculated as follows:

$$\frac{3}{1.02} + \frac{103}{1.02^2} = 101.9416$$

Which is higher than the bond's market price of 100.9641. Therefore, an arbitrage opportunity exists. Since the bond's value (100.9641) is less than the sum of the values of its discounted cash flows individually (101.9416), a trader would perceive an arbitrage opportunity and could buy the bond while selling claims to the individual cash flows (zeros), capturing the excess value. The arbitrage-free prices of Bond A and Bond C are equal to the market prices of the respective bonds, so there is no arbitrage opportunity for these two bonds:

$$\text{Bond A:} \frac{1}{1.02} + \frac{101}{1.02^2} = 98.0584$$

$$\text{Bond C:} \frac{5}{1.02} + \frac{105}{1.02^2} = 105.8247$$

46.【单项选择题】Based on Exhibits 2 and 3 and using Method 1, the amount (in absolute terms) by which the Hutto-Barkley corporate bond is mispriced is closest to:

A. 0.3368 per 100 of par value.

B. 0.4682 per 100 of par value.

C. 0.5156 per 100 of par value.

参考答案：C

【莽学解析】The first step in the solution is to find the correct spot rate (zero-coupon rates) for each year's cash flow. The benchmark bonds in Exhibit 2 are conveniently priced at par so the yields to maturity and the coupon rates on the bonds are the same. Because the one-year issue has only one cash flow remaining, the YTM equals the spot rate of 3% (or z_1 = 3%). The spot rates for Year 2 (z_2) and Year 3 (z_3) are calculated as follows:The correct arbitrage-free price for the Hutto-Barkley Inc. bond is:P_0=3/(1.0300)＋3/(1.0402)^2＋103/(1.0507)^3=94.4828Therefore, the bond is mispriced by 94.4828 - 94.9984 = -0.5156 per 100 of par value.A is incorrect because the correct spot rates are not calculated and instead the Hutto-Barkley Inc. bond is discounted using the respective YTM for each maturity. Therefore, this leads to an incorrect mispricing of 94.6616 - 94.9984 = -0.3368 per 100 of par value.B is incorrect because the spot rates are derived using the coupon rate for Year 3 (maturity) instead of using each year's respective coupon rate to employ the bootstrap methodology. This leads to an incorrect mispricing of 94.5302 - 94.9984 = -0.4682 per 100 of par value.

47.【单项选择题】Method 1 would most likely not be an appropriate valuation technique for the bond issued by:

A.Hutto-Barkley Inc.

B.Luna y Estrellas Intl.

C.Peaton Scorpio Motors.

参考答案：B

【莽学解析】The Luna y Estrellas Intl. bond contains an embedded option. Method 1 will produce an arbitrage-free valuation for option-free bonds; however, for bonds with embedded options, changes in future interest rates impact the likelihood the option will be exercised and so impact future cash flows. Therefore, to develop a framework that values bonds with embedded options, interest rates must be allowed to take on different potential values in the future based on some assumed level of volatility (Method 2).A and C are incorrect because the Hutto-Barkley Inc. bond and the Peaton Scorpio Motors bond are both option-free bonds and can be valued using either Method 1 or Method 2 to produce an arbitrage-free valuation.

48.【单项选择题】Based on Exhibit 4 and using Method 2, the correct price for Bond X is closest to:

A.97.2998.

B.109.0085.

C.115.0085.

参考答案：B

【莽学解析】This is the binomial tree that obtains a bond value of 109.0085.The first step is to identify the cash flows:

Next, calculate the cash flows for each year beginning with Year 3 and move backwards to Year 1:Year

3:0.5×[(106/1.06)+(106/1.06)]+6=106.00000.5×[(106/1.05)+(106/1.05)]+6=106.95240.5×[(106/1.03)+(106/1.03)]+6=108.9126Year

2:0.5×[(106.0000/1.04)+(106.9524/1.04)]+6=108.38100.5×[(106.9524/1.02)+(108.9126/1.02)]+6=111

Time 0	Time 1	Time 2	Time 3
			106
		6	
	6		106
0		6	
	6		106
		6	
			106

.8162Year 1:0.5×［(108.3810/1.01)+(111.8162/1.01)］=109.0085A is incorrect because the Time T coupon payment is subtracted from the value in each node calculation for Time T. C is incorrect because it assumes that a coupon is paid at Time 0.

【题干】Rowan Madison is a junior analyst at Cardinal Capital. Sage Winter, a senior portfolio manager and Madison's supervisor, meets with Madison to discuss interest rates and review two bond positions in the firm's fixed-income portfolio.

Winter begins the meeting by asking Madison to state her views on the term structure of interest rates. Madison responds:

"Yields are a reflection of expected spot rates and risk premiums. Investors demand risk premiums for holding long-term bonds, and these risk premiums increase with maturity."

Winter tells Madison that, based on recent changes in spreads, she is concerned about a perceived increase in counterparty risk in the economy and its effect on the portfolio. Madison asks Winter:

"Which spread measure should we use to assess changes in counterparty risk in the economy?"

Winter is also worried about the effect of yield volatility on the portfolio. She asks Madison to identify the economic factors that affect short-term and long-term rate volatility. Madison responds:

"Short-term rate volatility is mostly linked to uncertainty regarding monetary policy, whereas long-term rate volatility is mostly linked to uncertainty regarding the real economy and inflation."

Finally, Winter asks Madison to analyze the interest rate risk portfolio positions in a 5-year and a 20-year bond. Winter requests that the analysis be based on level, slope, and curvature as term structure factors. Madison presents her analysis in Exhibit 1.

Winter asks Madison to perform two analyses:

Analysis 1: Calculate the expected change in yield on the 20-year bond resulting from a two standard deviation increase in the steepness factor.

Analysis 2: Calculate the expected change in yield on the five-year bond resulting from a one

Exhibit 1. Three-Factor Model of Term Structure

	Time to Maturity (yea
Factor	**5**
Level	−0.4352%
Steepness	−0.0515%
Curvature	0.3963%

Note: Entries indicate how yields would change for a one standard devi

factor.

standard deviation decrease in the level factor and a one standard deviation decrease in the curvature factor.

49.【单项选择题】Madison's views on the term structure of interest rates are most consistent with the:
A. local expectations theory.
B. segmented markets theory.
C. liquidity preference theory.
参考答案：C
【荞学解析】Liquidity preference theory asserts that investors demand a risk premium, in the form of a liquidity premium, to compensate them for the added interest rate risk they face when buying long-maturity bonds. The theory also states that the liquidity premium increases with maturity.

50.【单项选择题】Is Madison's response regarding the factors that affect short-term and long-term rate volatility correct?
A. Yes
B. No, she is incorrect regarding factors linked to long-term rate volatility
C. No, she is incorrect regarding factors linked to short-term rate volatility
参考答案：A
【荞学解析】Madison's response is correct; research indicates that short-term rate volatility is mostly linked to uncertainty regarding monetary policy, whereas long-term rate volatility is mostly linked to uncertainty regarding the real economy and inflation.

51.【单项选择题】Based on Exhibit 1, the results of Analysis 1 should show the yield on the 20-year bond decreasing by:

A. 0. 3015%.

B. 0. 6030%.

C. 0. 8946%.

参考答案：B

【莽学解析】Because the factors in Exhibit 1 have been standardized to have unit standard deviations, a two standard deviation increase in the steepness factor will lead to the yield on the 20-year bond decreasing by 0.6030%, calculated as follows: Change in 20-year bond yield = −0.3015% × 2 = −0.6030%.

52.【单项选择题】Based on Exhibit 1, the results of Analysis 2 should show the yield on the five-year bond:

A. decreasing by 0.8315%.

B. decreasing by 0.0389%.

C. increasing by 0.0389%.

参考答案：C

【莽学解析】Because the factors in Exhibit 1 have been standardized to have unit standard deviations, a one standard deviation decrease in both the level factor and the curvature factor will lead to the yield on the five-year bond increasing by 0.0389%, calculated as follows: Change in five-year bond yield = 0.4352% − 0.3963% = 0.0389%.

【题干】Lena Liecken is a senior bond analyst at Taurus Investment Management. Kristel Kreming, a junior analyst, works for Liecken in helping conduct fixed-income research for the firm's portfolio managers. Liecken and Kreming meet to discuss several bond positions held in the firm's portfolios. Bonds I and II both have a maturity of one year, an annual coupon rate of 5%, and a market price equal to par value. The risk-free rate is 3%. Historical default experiences of bonds comparable to Bonds I and II are presented in Exhibit 1.

Exhibit 1　Credit Risk Information for Comparable Bonds

Bond	Recovery Rate	Percentage of Bonds That Survive and Make Full Payment
I	40%	98%
II	35%	99%

Bond III is a zero-coupon bond with three years to maturity. Liecken evaluates sim- ilar bonds and estimates a recovery rate of 38% and a risk-neutral default probability of 2%, assuming conditional probabilities of default. Kreming creates Exhibit 2 to compute Bond III's credit valuation adjustment. She assumes a flat yield curve at 3%, with exposure, recovery, and loss

given default values expressed per 100 of par value.

Exhibit 2　Analysis of Bond III

Date	Exposure	Recovery	Loss Given Default	Probability of Default	Probability of Survival	Expected Loss	Presen Expe
0							
1	94.2596	35.8186	58.4410	2.0000%	98.0000%	1.1688	1.
2	97.0874	36.8932	60.1942	1.9600%	96.0400%	1.1798	1.
3	100.0000	38.0000	62.0000	1.9208%	94.1192%	1.1909	1.
Sum				5.8808%		3.5395	3.

Bond IV is an AA rated bond that matures in five years, has a coupon rate of 6%, and a modified duration of 4.2. Liecken is concerned about whether this bond will be downgraded to an A rating, but she does not expect the bond to default during the next year. Kreming constructs a partial transition matrix, which is presented in Exhibit 3, and suggests using a model to predict the rating change of Bond IV using leverage ratios, return on assets, and macroeconomic variables.

Exhibit 3　Partial One-Year Corporate Transition Matrix (entries in %)

From/To	AAA	AA	A
AAA	92.00	6.00	1.00
AA	2.00	89.00	8.00
A	0.05	1.00	85.00
Credit Spread (%)	0.50	1.00	1.75

Kreming calculates the risk-neutral probabilities, compares them with the actual default probabilities of bonds evaluated over the past 10 years, and observes that the actual and risk-neutral probabilities differ. She makes two observations regarding the comparison of these probabilities:Observation 1: Actual default probabilities include the default risk premium associated with the uncertainty in the timing of the possible default loss.Observation 2: The observed spread over the yield on a risk-free bond in practice includes liquidity and tax considerations, in addition to credit risk.

53.【单项选择题】The expected exposure to default loss for Bond I is:
A. less than the expected exposure for Bond II.

B. the same as the expected exposure for Bond II.

C. greater than the expected exposure for Bond II.

参考答案：B

【莽学解析】The expected exposure is the projected amount of money that an investor could lose if an event of default occurs, before factoring in possible recovery. The expected exposure for both Bond I and Bond II is 100 + 5 = 105.

54.【单项选择题】Based on Exhibit 1, the loss given default for Bond II is:

A. less than that for Bond I.

B. the same as that for Bond I.

C. greater than that for Bond I.

参考答案：C

【莽学解析】The loss given default is a positive function of the expected expo- sure to default loss and a negative function of the recovery rate. Because Bond II has a lower recovery rate than Bond I and the same expected exposure to default loss (100 + 5 = 105), it will have a higher loss given default than Bond I will have. The loss given default for Bond I is 105 × (1 - 0.40) = 63.00. The loss given default for Bond II is 105 × (1 - 0.35) = 68.25.

55.【单项选择题】Based on Exhibit 1, the expected future value of Bond I at maturity is closest to:

A. 98.80.

B. 103.74.

C. 105.00.

参考答案：B

【莽学解析】In the event of no default, the investor is expected to receive 105. In the event of a default, the investor is expected to receive 105 - [105 × (1 - 0.40)] = 42. The expected future value of the bond is, therefore, the weighted average of the no-default and default amounts, or (105 × 0.98) + (42 × 0.02) = 103.74.

56.【单项选择题】Based on Exhibit 1, the risk-neutral default probability for Bond I is closest to:

A. 2.000%.

B. 3.175%.

C. 4.762%.

参考答案：B

【莽学解析】The risk-neutral default probability, P*, is calculated using the current price, the expected receipt at maturity with no default (that is, 100＋5 = 105), the expected receipt at maturity in the event of a default (that is, 0.40 × 105 = 42), and the risk-free rate of interest (0.03):

$$100 = \frac{[105 \times (1 - P^*)] + (42 \times P^*)}{1.03}$$

Solving for P* gives 0.031746, or 3.1746%.

57.【单项选择题】Based on Exhibit 2, the credit valuation adjustment for Bond III is closest to:

A. 3.3367.

B. 3.5395.

C. 5.8808.

参考答案：A

【莽学解析】The CVA is the sum of the present value of expected losses on the bond, which from Exhibit 2 is 3.3367.

58.【单项选择题】Based on Exhibit 3, if Bond IV's credit rating changes during the next year to an A rating, its expected price change would be closest to:

A. − 8.00%.

B. − 7.35%.

C. − 3.15%.

参考答案：C

【莽学解析】The expected percentage price change is the product of the neg- ative of the modified duration and the difference between the credit spread in the new rating and the old rating: Expected percentage price change = − 4.2 × (0.0175 − 0.01) = − 0.0315, or − 3.15%.

59.【单项选择题】Kreming's suggested model for Bond IV is a:

A. structural model.

B. reduced-form model.

C. term structure model.

参考答案：B

【莽学解析】A reduced-form model in credit risk analysis uses historical vari- ables, such as financial ratios and macroeconomic variables, to estimate the default intensity. A structural model for credit risk analysis, in contrast, uses option pricing and relies on a traded market for the issuer's equity.

60.【单项选择题】Which of Kreming's observations regarding actual and risk-neutral default probabilities is correct?

A. Only Observation 1

B. Only Observation 2

C. Both Observation 1 and Observation 2

参考答案：B

【莽学解析】Observation 1 is incorrect, but Observation 2 is correct. The actual default probabilities do not include the default risk premium associated with the uncertainty in the timing of the possible default loss. The observed spread over the yield on a risk-free bond in practice does include liquidity and tax con- siderations, in addition to credit risk.