Questions 55–60 relate to Ted Thompson.

Ted Thompson, CIO for Aplius Insurance company, is evaluating the credit risk management models for the company's fixed income portfolio. Thompson meets with Nambi Musa, who is the head of Aplius's credit risk analysis department. Musa assures Thompson that his team has updated the credit risk analysis models over recent years and that these updated models have performed well over the past 12 months. Thompson, however, is not pleased with the losses incurred on Aplius's municipal bond holdings in the last quarter.

Musa mentions that while the credit risk analysis department continues to use credit ratings, they are also evaluating other analytical tools including structural models. He specifically mentions present value of expected loss as one credit risk measure currently being used. Musa makes the following statements:

Statement 1: "One of the strengths of credit ratings is that they tend to be stable over time and hence reduce the price volatility in debt markets."

Statement 2: "The present value of expected loss on a bond is the maximum amount an investor would be willing to pay to an insurer to bear the credit risk of that security."

Statement 3: "One of the assumptions of the structural models of credit analysis is that the default risk changes over a business cycle."

Statement 4: "In case of an ABS, credit analysis focuses on the probability of loss instead of the probability of default."

Musa further discusses the credit analysis metrics that are newly developed. As an example, he illustrates the valuation conducted on 1-year, 5% Zeta Corp. senior unsecured bonds. Exhibit 1 shows the report. Rates are continuously compounded.

Exhibit 1: Valuation of 1-year, 5% Zeta Corp. Bond

Time to Cash Flow	*Cash Flow*	*Risk-Free Spot Rate (%)*	*Credit Spread (%)*
0.5	25	0.23	0.8
1	1025	0.25	0.85

Thompson then tells Musa that the credit analysis department should focus on reduced form models. Thompson states that, "reduced form models perform better than structural models as they tend to impose assumptions on the outputs of the structural model. However, reduced form models require a specification of the company's balance sheet composition."

55. Musa's statement 1 is *most likely*:
    A. correct.
    B. incorrect because credit ratings are unstable over time.
    C. incorrect because of the implied relation to price volatility in debt markets.

56. Musa's statement 2 is *most likely*:
    A. correct.
    B. incorrect as the statement only considers credit risk.
    C. incorrect as the statement should refer to expected loss and not to present value of expected loss.

57. Musa's statement 3 is *most likely*:
    A. correct.
    B. incorrect as structural models assume that default risk is constant over a business cycle.
    C. incorrect as structural models assume that default risk is constant over the life of the bond.

58. Musa's statement 4 is *most likely*:
    A. correct.
    B. incorrect as credit analysis of ABS focuses on the probability of default instead of the probability of loss.
    C. incorrect as credit analysis of ABS focuses on probability of tranche default instead of probability of default.

59. Using information in Exhibit 1, the present value of expected loss for the Zeta Corp. bond is *closest* to:
    A. $7.74.
    B. $8.25.
    C. $8.76.

60. Thompson's statement about reduced form models relative to structural model is *most likely*:
    A. correct.
    B. incorrect regarding assumptions imposed.
    C. incorrect regarding specification of balance sheet composition being required.

End of Morning Session

54. **A** The correct value is 100.00. The computed value of the callable bond at node A is obtained as follows:

$$\text{value} = \frac{\left[0.5\times\left(100+\frac{6}{2}\right)\right]+\left[0.5\times\left(100+\frac{6}{2}\right)\right]}{\left(1+\frac{0.0315}{2}\right)} = 101.4$$

However, when working with a callable bond, you have to remember that the value of the bond at any node is the lesser of (1) the bonds computed value or (2) the call price. So, we have:

$$\text{value} = \text{Min}\left[100\ ,\ \frac{\left[0.5\times\left(100+\frac{6}{2}\right)\right]+\left[0.5\times\left(100+\frac{6}{2}\right)\right]}{\left(1+\frac{0.0315}{2}\right)}\right] = 100$$

In this case, since the computed value (101.4) is greater than the call price (100), the nodal value is $100. (Study Session 13, LOS 37.f)

55. **A** Statement 1 is correct. Credit ratings tend to be stable over time and across business cycles, which has the effect of reducing price volatility in the debt market. (Study Session 13, LOS 38.c)

56. **A** Statement 2 is correct. (Study Session 13, LOS 38.a)

57. **C** One of the assumptions of structural models is that default risk is constant during the life of the bond and hence does not change over business cycles or in response to changing economic variables. (Study Session 13, LOS 38.f)

58. **A** Statement 4 is correct. Probability of default does not apply to asset-backed securities because ABS do not default when an underlying collateral defaults. For this reason, probability of loss is used in place of probability of default for ABS. (Study Session 13, LOS 38.i)

59. **C**

Time to Cash Flow	*Cash Flow*	*Risk-Free Spot Rate*	*Credit Spread (%)*	*Total Yield (%)*	*PV (Risk-Free Rate)*	*PV (Total Yield)*
0.5	25	0.23%	0.80%	1.03%	24.97	24.87
1	1,025	0.25%	0.85%	1.10%	1,022.44	1,013.79
				Total	$ 1,047.41	$ 1,038.66

PV(risky $1,025) = $1{,}025/e^{(1*0.011)}$ = $1,013.787
Present value of expected loss = PV(risk-free rate) – PV(total yield)
= 1,047.41 – 1,038.66 = $8.75

(Study Session 13, LOS 38.h)

60. **C** While Thompson's statement about reduced form models imposing assumptions on the output of structural models is correct, Thompson is incorrect about balance sheet composition being required; reduced form models do not require a specification of the company's balance sheet structure. (Study Session 13, LOS 38.f)