XP Actuarial Practice Questions – Asset/Liability Management (CP351)

SAMPLE – 2025/26

For 2025/2026, XPA will provide at least 2 practice questions per reading and chapter across the entire syllabus. Also, at least three 1-hour practice exams will be provided.

In addition, a small number of teaching videos will be provided for select topics and videos on tips that XP has learned about how to increase your probability of passing FSA exams.

Five sample questions are below:

1. (3 points)

XPA Life is a Canadian life insurer with a large block of new life insurance sales. A large percentage of the life insurance liability cash flows extend beyond 30 years.

SLAY Asset Management has proposed and will assist with the following strategy to XPA Life to increase returns for assets backing the 30 year and later liability cash flows on its new sales over the next 2 years:

- Invest in equites diversified across North America, Europe, and Asia
- Invest in large toll highway developments in Australia and New Zealand

(a) (3 points) Identify 4 major concerns the XPA Life should have with this strategy in assessing if this strategy will benefit XPA. Justify your answers.

ANSWER:

2. (1 point)

(a) (1 point)
Identify 2 lessons learned from the Long Term Capital Management (LTCM) Collapse for risk management.

ANSWER:

3. (2 points)

Jerry has $1000 to invest. He is looking to buy Tesla (TSLA) stock. TSLA does not pay dividends, has a current stock price of $200 and implied volatility of 0.35.

Jerry is considering two different ways of investing the $1000.

I. Invest all of the funds in TSLA stock
II. But 2 put options on TSLA with strike of $160 and term of 1 year. The rest of the portfolio would be invested in TSLA stock. (Note: partial share ownership is possible).

Assume the options are priced using the Black-Scholes formula with risk-free rate of 4%.

(a) (1 point) Calculate the shares of TSLA stock purchased under II. Show your work

ANSWER:

(b) (1 point) Calculate the delta of Portfolio II. Show your work.

ANSWER:

(c) (1 point) Calculate the 1-day VAR (99%) of each portfolio using the delta-normal method. Show your work.

ANSWER:

4. (4 points)

Amazon.com has issued a 3-year floating rate bond with face value of $200 million to fund the growth of its cloud computing business. The interest rate payable is LIBOR+40 basis points.

Amazon's risk manager ins concerned about the possibility of rising interest rates over the term of the bond.

(a) (2 points) Explain how Amazon could mitigate the risk of rising interest rates using:

(i) Interest rate swaps

(ii) Interest rate caps

ANSWER:

JP Morgan Bank has offered Amazon an interest rate swap. Amazon has agreed to pay LIBOR+40 basis points to JP Morgan. In return, JP Morgan agreed to pay a fixed rate of X% per year. The swap payment is annual, and the term is 3-years.

The current annual spot yields are:

1-year: 2.7%,, 2-year 3.0%, 3-year 3.2%

(b) (2 points) Calculate the swap rate, X%. Show your work

ANSWER: Your calculations should be done in the attached excel spreadsheet.

5. (5 points)

You have two random variables that represent the annual losses from each of the Individual Life Insurance line of business (Loss-LI) and the Group Employee Benefits line of business (Loss-GB).

Loss-LI follows a Normal distribution with parameters (1000, 40000)
Loss-GB follows a Gamma distribution with parameters (4, 200)

The risk tolerances set by the Board of Directors for each line of business are:

LI = 1,200
GB = 1,300

(a) (2 points) Calculate the probability that the losses are below the risk tolerances for each line of business. Show your work.

ANSWER: Your calculations should be done in the attached excel spreadsheet.

(b) (2 points) Calculate the probability that both of the losses are below the total risk tolerances, if they are independent. Show your work.

ANSWER: Your calculations should be done in the attached excel spreadsheet.

(c) (1 point) Calculate the probability that both losses are below the total risk tolerances, if the copula function for dependence is:

$$C(u_1, u_2) = \min(u_1, u_2)$$

Show your work.

ANSWER: Your calculations should be done in the attached excel spreadsheet.

**** End of XPA Sample Questions for Asset/Liability Management (CP351) Exam ****