TABLE OF CONTENTS

SECTION A

FINANCIAL REPORTING

***CANADIAN INSURANCE TAXATION* (BORGMANN ET. AL.)**
CHAPTER 3 – LIABILITY FOR INCOME TAX

I. Liability for Income Tax

1. General rule: corporations resident in Canada are subject to income tax on worldwide income. This rule does not apply to Canadian-resident insurers that carry on insurance business outside of Canada.

2. Liability of life insurance companies for Canadian income tax purposes:

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="2">Source of Income</td></tr>
<tr><td>Foreign earned</td><td>Earned in Canada</td></tr>
<tr><td rowspan="2">Non-resident insurer</td><td>Income from ins. business</td><td rowspan="3">Not taxable</td><td rowspan="3">Taxable</td></tr>
<tr><td>Income from other business</td></tr>
<tr><td rowspan="2">Canadian resident insurer</td><td>Income from ins. business</td></tr>
<tr><td>Income from other business</td><td></td></tr>
</table>

3. Under common-law principles, a corporation is resident in the country where its "central management and control" is exercised. All corporations incorporated in Canada after April 1965 are resident in Canada.

4. In some situations, a corporation can be resident in more than one country. If a treaty provides that a corporation is resident in a country other than Canada, the corporation will be deemed to be a non-resident under the Act.

5. Canada's international tax treaties generally restrict Canadian taxation of a non-resident's business income to the portion allocable to a permanent establishment located in Canada.

***CANADIAN INSURANCE TAXATION* (BORGMANN ET AL.)**
CHAPTER 4 – INCOME FOR TAX PURPOSES

I. Inclusions in Net Income

1. Insurers must include in income the amount of net premiums written on the sale of life insurance policies and amounts received in respect of annuities.
2. Insurers must income in income any amount received as a repayment of policy loan or interest on policy loan.
3. Negative tax reserves must be included in income for the year.
4. Insurers that own vacant real property must include an imputed interest benefit in income and add to the cost of the property. The rule is intended to prevent insurers from reducing the amount of investment income by investing in no or low income producing real estate.
    a. See Chapter 4 Appendix (page 40) for an illustration of the imputed financing benefit
5. Foreign accrual property income (FAPI) generally includes passive income from an inactive business and certain realized capital gains.
6. The principal goal of the FAPI rules is to ensure passive investment income earned by a controlled foreign affiliate is taxable in Canada on an immediate basis rather than when dividends are received.
7. Activities of a foreign insurance business that most commonly create FAPI:
    a. Income from investment business
    b. Insurance of risks by foreign affiliates
    c. Insurance of Canadian risks

II. Deductions from Income from a Life Insurance Business

A. Payments to Policyholders – deductible items
1. All policy loans made during the year to policyholder are deductible.
2. Claims paid on insurance policies are deductible.
3. Reserve for unpaid claims (including incurred but not reported claims) is deductible.
4. Policyholder dividends payable and paid are deductible, provided the amount was not deducted in a prior year.
5. A reserve is deductible for participating policy dividends that will become payable in the following year. See page 41 for computational formulas.
6. Experience rating refund arises when a % of premiums is refunded because the insurer's loss experience was better than anticipated. The experience rating refunds are deductible.
7. Insurers may deduct only interest that was incurred on:
    a. Borrowed money used to acquire property
    b. Deposits held in connection with life insurance policies or policies insuring Canadian risks

8. Special rules known as "thin capitalization rules" limit the deductibility of interest on debt a Canadian corporation owes to specific non-resident shareholders.
    a. Debt owed to a non-resident insurer is excluded from the thin capitalization rules if the insurer treats debt as designated insurance property in respect of an insurance business carried on in Canada through a permanent establishment.
9. Insurer may deduct a reserve for doubtful loans or lending assets.
10. Unearned premium reserves are fully deductible.
11. Generally prepaid expenses are not deductible. The exception is prepaid consideration for reinsurance.
12. Rental loss on real properties may offset the insurer's income from other sources e.g. premium, interest, dividend incomes.
13. Investment income tax payable for the year is deductible.
14. Prescribed reserves are deductible.

III. Income on Non-residents from a Life Insurance Business

1. Net capital gains are included in a non-resident insurer's net income to the extent that they are derived from capital property that is designated to a Canadian insurance business.
2. Taxable Canadian Property:
    a. Property designed to an insurance business
    b. Real property situated in Canada
    c. Property used by non-resident to carry on a business (non-insurance) in Canada
    d. Shares in corporations resident in Canada that are not listed on designated exchange

CANADIAN INSURANCE TAXATION (BORGMANN ET AL.)
CHAPTER 5 – INVESTMENT INCOME

I. Overview

1. Under existing tax rules:
   a. Premiums/discounts and realized gains/losses on most debt investments that are not mark-to-market (MTM) are included in income over the term of the debt
   b. Credit gains/losses and foreign exchange gains/losses on debt investments that are not MTM are included in income
   c. Realized gains/losses on shares are included in income when realized
   d. Accrued gains/losses on shares and on specified debt obligations (SDOs) are included in income
2. Under new tax rules:
   a. SDOs formerly held at amortized cost will become MTM properties.
   b. Definition of MTM property has been expanded to include tracking property.

II. History

A. Before 1993
   1. Taxation of gains/losses arising on disposition of insurers' investments had historically been treated on capital account.
   2. Gains on account of capital received more favourable tax consequences than those on income account.
   3. For tax purposes, premiums/discounts were required to be amortized on a current basis only for Canadian securities.

B. After 1992 and Before February 23, 1994
   1. Gains/losses realized on the dispositions of investments held under 2 years were on account of income; those held more than 4 years were on account of capital.
   2. No direction was provided for investment held more than 2 years but under 4 years.
   3. For life insurers that followed the guideline, the effect was only on their share portfolios because Canada security rules governed their debt portfolios.

C. After February 22, 1994 and Before Taxation Years Ended Before October 1, 2006
   1. Department of Finance designed new proposals to remove some uncertainty concerning the tax treatment of securities, subject all financial institutions to the same rules and eliminate opportunities for manipulating taxable income
   2. The legislation affects the timing of the recognition of gains/losses and whether the recognized amounts are considered to be on account of income or capital.

D. New Legislation Affecting Taxation Years Beginning on after October 1, 2006
   1. New accounting standard requires that financial instruments be measured at their fair value or cost on the financial statements, depending on their accounting classification.

	Description	Measurement	Gains/Losses
Loans and receivables	Loans & receivables other than debt securities	Amortized costs	Through net income
Held to maturity	Fixed maturity with fixed payment to hold until maturity		
Held for trading	Acquired for selling in near term	Fair value	
Available for sale	Does not qualify in any other category		> Unrealized gains/losses through other comprehensive income > Realized gains/losses through net income

2. Definition of MTM properties has been expanded to include new terms such as "excluded property", "fair value property, and "tracking property".
3. SDOs formerly held at amortized cost are not MTM properties.
4. Realized and unrealized gains/losses on SDOs are not MTM properties and fully taxable in the year that they occur.
5. Gains/losses realized on SDOs disposed of before the change in accounting treatment will continue to be amortized into taxable income.

III. Specified Debt Obligations (SDO)

1. A specified debt obligation (SDO) includes the interest that a taxpayer holds in a loan, bond, debenture, mortgage, note, agreement of sale or any other similar indebtedness.
2. Exclusions of SDO:
   a. Income bonds
   b. Income debenture
   c. Small business bonds
   d. Small business development bonds
3. Shares in a related corporation or that carry at least 10% of the votes and represent at least 10% of the fair market value of all issued shares constitute a "**significant interest**".
4. SDOs acquired before the adoption of Fair Value Accounting (CIA Section 3855) generally are not MTM properties.
5. SDOs acquired after the adoption of Fair Value Accounting would be MTM properties if the debt obligations were carried at fair value for accounting purposes.

A. Income from SDOs that are not MTM properties
   1. SDOs classified as held-to-maturity are carried at amortized cost for accounting purposes and are not MTM properties.

2. Exemptions to the amortization principle apply to credit related amounts and gain/losses related to foreign exchange fluctuations.
3. Any discount/premium on a SDO is amortized over the term of the debt. The amortization method depends on whether the SDO is a fixed payment obligation.
    a. For fixed payment obligations, income inclusion is determined using either the level-yield method or other method that is substantially similar.
    b. For obligations that are not fixed payment obligations, the amortization method must be reasonably consistent with the methods permitted for fixed payment obligations.
4. Included in income in the current period but not amortized are:
    a. Credit-related gains/losses
    b. Foreign exchange gains/losses arising from year-end translation into $CAD of obligations that are denominated in foreign currency
    c. Amounts in respect of obligation under which at least one payment is subject to contingencies

B. Gains/Losses on Disposition of SDOs that are not MTM Properties
1. Insurers that dispose of SDO that are not MTM properties must segregate gain/loss into 3 amounts:
    a. Current amount – included in income
    b. Transition amount – included in income
    c. Residual portion – generally amortized over the remaining term of the obligation, either straight line basis or a substantially similar method
2. Current amount: credit-related portion of the gain/loss attributable to the debtor's default or to a material changes in the likelihood that debtor will satisfy the obligation
3. Residual portion: gain/loss that remains after deducting from the proceeds of disposition.
4. On the disposition of SDO that are not MTM properties and have no more than 2 years to maturity after the end of the year of disposition, gains/losses are to be recognized when realized and not amortized.
5. The amortization requirement is also waived if the disposition of a SDO results in its extinguishment.

IV. Mark-to-Market (MTM) Properties

A. General
1. Most shares of corporations are MTM properties.
2. "Excluded property" includes:
    a. Share of a corporation in which the taxpayer has a significant interest
    b. Share of a prescribed payment card corporation
    c. Prescribed securities exchange investment held by an investment dealer
    d. A prescribed property
3. "Fair value property" includes any property held at any time during the taxation year that would be carried at its fair market value for financial statements.

4. "Tracking property" is property whose value is determined primarily by reference to certain criteria of other property. The criteria are:
    a. Fair market value
    b. Profits or gains from disposition
    c. Revenue, income, or cash flow
    d. Any other similar criteria in respect of the other property
5. MTM properties are subject to 2 main deeming rules:
    a. The first deems any gains/losses realized on the disposition to be on account of income
    b. The second deems a disposition at fair market value of MTM property at the end of taxation year in which a taxpayer owns the property
6. Dividends are included in net income for tax purposes in the year received, even it is after the year the dividends are declared.
7. Dividends that may be deducted in calculation of taxable income include:
    a. Taxable Canadian corporations
    b. Taxable subsidiary corporations resident in Canada
    c. Non-resident corporations in Canada and thus taxable in Canada
    d. The exempt surplus pools of foreign affiliates
8. Interest that has accrued but has not been received is reflected in the fair market value of the obligation, and so will be recognized as MTM.

B. Gains/Losses on MTM Property
1. As a result of adoption of Section 3855 for taxation years beginning on or after October 1, 2006, most SDOs are now measured at fair market value instead of amortized cost.
2. Insurers had significant accrued gains and transitional rules have been enacted to spread the initial effect over 5 years.
3. SDOs would qualify as transition property if they were:
    a. Acquired before Fair Value Accounting was adopted
    b. Historically carried at amortized cost
    c. Carried at fair market value after the adoption of Fair Value Accounting

V. Special Situations

1. Special rules affect the treatment of SDO and MTM properties when:
    a. A taxpayer ceases to be a financial institution
    b. A property ceases to be an "excluded property"
    c. Investments are transferred from one business to another
    d. A loss is incurred on the disposal of an investment

For Classes of Investments, see Appendix on pages 62-63.

CANADIAN INSURANCE TAXATION (BORGMANN ET AL.)
CHAPTER 6 – RESERVES

I. Overview

1. Generally reserves are not deductible for tax purposes. However, they are permitted in limited situations, if specific criteria are met.
2. Reserve rules allow deduction of any amount of reserves up to the maximum permitted by regulation. Reserves deducted in a tax year must be included in the insurer's income for the following year.
3. Insurers are required to recognize negative reserves other than pre-1996 non-cancellable or guaranteed renewable accident and sickness (A&S) policies.
4. The aggregate of the maximum amount of life insurance policy reserves, excluding the reserve for unpaid claims, is defined to the **maximum tax actuarial reserves** (MTARs).

II. History

Year 1969

1. When life insurers were first subject to income tax, policy makers attempted to develop an appropriate method for determining MTARs.
2. Net level premium method was initially adopted which assumes a level incidence of expenses. The use of this method created mismatch between revenue and costs.

Year 1978

1. Use of the full preliminary term method under which a reserve is not permitted in the year the policy is issued.
2. Better balance between deduction for acquisition costs and premium revenues received during the first year after the policy is issued.

Year 1988

1. MTARs again reduced by replacing the full preliminary term method with the one-and-one-half-year preliminary term method.
2. The new method better matched income and expenses because it disallows a deduction for reserves during the first 18 months after policy issue.

Year 1996

1. New regulations classified life insurance policies as pre-1996 and post-1995 policies.
2. For policies issued after 1995, MTARs are based on the amount reported in the insurer's financial statements, except the tax reserve must be determined excluding projected income and capital taxes
3. Former rules for calculating MTAR continue to apply to pre-1996 policies (1½ preliminary term method)

Year 2000

1. Since 2000, unearned premium reserves, other than non-cancellable or guarantee renewable A&S policies and group life policies are calculated using the gross premium rather than the premium net of deemed acquisition expenses.

Year 2006

1. Introduction of Fair Value Accounting (CICA Section 3855) requires an insurer to revalue its investments on a fair value basis.
2. In the year of transition, an increase or decrease in reserves may be recorded in the financial statements. This change in reserves is reflected in the opening retained earnings in the year Section 3855 is adopted.
3. MTARs for pre-1996 policies will be calculated on the same basis as post-1995 policies.

III. Life Insurance Policies

1. Insurers may deduct any amount in respective of life insurance policy reserves, up to the maximum amount prescribed by regulation. Reserves must be calculated after deducting the portion reinsured.
2. Generally interest and mortality assumptions for calculating 1½ preliminary term reserve will be those used to set the premium. For a participating policy, the assumptions will be those used to calculate the cash surrender value.
3. Unearned premium reserve is permitted for group term life policies that provide coverage for a period of 12 months or less. The maximum reserve for policies is 100% of the unearned premium.
4. A reserve is permitted for certain supplementary benefits, risks and guarantees that are provided under a life insurance policy, in addition to normal life risks.
5. Two types of reserves are allowed:
    a. Claims that were reported but unpaid at year end
    b. Claims that have incurred but not reported (IBNR)
6. A reserve may be claimed in respect of a dividend, refund of premiums or refund of premium deposit provided under a group term life insurance policy if such an amount was not otherwise deductible.
    a. Maximum reserve is 25% of the premium payable for the 12-month period
7. For all life insurance policies, the MTAR must be reduced for outstanding policy loans.

IV. Non-Life Insurance Policies

1. In general, a reserve is allowed when the reinsurance commission charged to the reinsurer exceeds premium ceded to the reinsurer.
2. A reserve may be deducted if:
    a. Claim was incurred and reported to the insurer and the insurer may be required to make a payment after year-end
    b. Claim may be incurred before the end of the year but not reported to insurer before end of the year
3. The reserve is generally 95% of the less of:
    a. Claims liability
    b. Reported reserve with respect to the claim

4. Regulations classify non-cancellable or guaranteed renewable A&S policies as either pre-1996 or post-1995 policies. A policy is pre-1996 if:
    a. It was issued before 1996
    b. Amount and number of premium payments and amount of benefits under the policy has not changed at any time after 1995
5. A reserve may be claimed in respect of a dividend, refund of premiums or refund of premium deposit provided under a group A&S policy if such an amount was not otherwise deductible.
    a. Maximum reserve is 25% of the premium payable for the 12-month period

V. Appendix

1. Reserves for life insurance policies; see Textbook page 82
2. Reserves for non-life insurance policies: see Textbook page 87

SECTION B

PRINCIPLES OF VALUATION

LFV-634-15
CANADIAN INSTITUTE OF ACTUARIES: STANDARDS OF PRACTICE, 2014

I. Insurance Contract Valuation: All Insurance

A. Scope
1. Applies to valuation of insurance contract liabilities and reinsurance recoverables in an insurer's financial statements that are in accordance with Canadian GAAP.
    a. The actuary would modify the standards to take account of substantive difference between insurer and a publicly accountable enterprise

B. Method
1. The actuary should coordinate the valuation with the accounting policy so that the insurance contract liabilities, reinsurance recoverables and other items on the balance sheet:
    a. Are consistent
    b. Avoid omission and duplication
    c. Conform to the presentation of income statement
2. Cash flows that comprise the insurance contract liabilities should include the effect of:
    a. Retrospective premium, commission, and similar adjustments
    b. Experience rating refunds
    c. Reinsurance ceded
    d. Subrogation and salvage
    e. The exercise of policy owner options
    f. The deemed termination at the end of the term of its liabilities of each policy
3. The actuary should ensure the application of margins of adverse deviations results in an increase to the liability net of reinsurance.
4. Going concern accounting is appropriate for an insurer that is expected to remain open to new business and in satisfactory financial positive indefinitely. It is also appropriate for an insurer that is expected to become closed to new business.
5. Insurance contract liabilities and reinsurance recoverables consist of premium liabilities and claim liabilities.
6. The value of the reinsurance recoverables is recorded as an asset. The recovery on account of insurance ceded would take account of the reinsurer's share of claims, commissions, allowances, retrospective premium adjustments and financial condition of the reinsurer.
7. The insurer's accounting policy may report amounts related to insurance contracts and assets that support liabilities either as part of the insurance contract liabilities or as separate items in the balance sheet or as a mixture of the two.
8. The term of the liabilities of a P&C policy ends at its expiry, which is usually within one year of the balance sheet date.
9. The liability for experience rating refunds would take account of:
    a. Assumptions in calculating the insurance contract liabilities in respect of those matters which determine experience rating refunds

   b. The difference between the basis for insurance contract liabilities and the corresponding basis in the experience rating

10. The actuary would either net subrogation and salvage amounts against claims or value them as a separate item, depending on the insurer's accounting policy.

11. Examples of policy owner options:
   a. Conversion of group insurance or individual term insurance
   b. Election of a settlement option in individual life insurance
   c. Purchase of additional insurance or coverage without underwriting
   d. Selection of the amount of premiums for UL insurance

12. Two methods to take account of time value of money and use forecasted cash flows to arrive at an equivalent single amount at the balance sheet date:
   a. Canadian asset liability method (CALM): "roll forward" method applicable to any scenario
   b. Actuarial present value method: "pull backward" method that produces the same result as CALM if present value factors replicate the investment return assumptions

13. The discount rates would take account of:
   a. Supporting assets at the balance sheet date and the insurer's policy for asset liability management
   b. Assumptions about investment return after the balance sheet date

C. Reporting
1. The actuary's report should describe:
   a. The valuation and presentation of policy liabilities and reinsurance recoverables for the insurer's balance sheet and income statement
   b. The actuary's opinion on the appropriateness of those liabilities and recoverables and on the fairness of their presentation
   c. The actuary's role in the preparation of the insurer's financial statements

2. Actuary's report should conform to the standard reporting language, consisting of:
   a. A scope paragraph, describing the actuary's work
   b. An opinion paragraph, providing the actuary's favourable opinion on valuation and presentation

3. In an unusual situation, fair presentation may require explanation of an item on the financial statements. Notes to the financial statements would provide that explanation, including disclosure of the effect on income and capital.
   a. Some examples of unusual situations: capital appropriated on the actuary's advice, off balance sheet obligations, restatement of items for preceding accounting periods

4. Meaningful comparability requires financial statement items for various periods to be consistent through restatement of preceding period items if they were inconsistently reported.
   a. A change in method of valuation or assumptions may create inconsistency

5. Communication with auditor is desirable at various stages of the actuary's work, including:
   a. Use of work in accordance with the CIA/CICA Joint Policy Statement
   b. Drafting of common features in auditor's and actuary's reports
   c. Drafting of a report with reservations

d. Presentation of insurance contract liabilities and reinsurance recoverables
e. Treatment of subsequent events

6. Examples of standard language for actuary's opinion in the report:
   a. Self-insured organization not obligated to have an appointed actuary (page 2017)
   b. Net appointment (page 2018)
   c. Impracticality of restatement (page 2018)
   d. Valuation does not take account of time value of money (page 2019)
   e. Takeover of insurer with poor records (page 2020)
   f. Liabilities greater than those calculated by the actuary (page 2020)

II. Insurance Contract Valuation: Life and Health Insurance

Method

1. The actuary should calculate insurance contract liabilities net of reinsurance recoverables by CALM.
   a. Under CALM, insurance contract liabilities is equal to amount of supporting assets that are forecasted to reduce to 0 coincident with the last liability cash flow
2. The term of the liabilities should take account of any renewal or adjustment equivalent to renewal.
3. The scenarios of interest rate assumption should comprise:
   a. A base scenario
   b. Each of the prescribed scenarios in a deterministic application
   c. Ranges that comprehend each prescribed scenario in a stochastic application
   d. Other scenarios appropriate for the insurer's circumstances

A. Supporting Assets
   1. In allocating assets supporting liabilities, the actuary would preserve the connection between unamortized capital gains and asset segments that generated them.
   2. Forecast of cash flow from taxes would take account of permanent and temporary differences.

B. Term of the Liabilities
   1. If a policy element operates independently of the other elements, it would be treated as a separate policy with its own term of liabilities.
   2. The term of the insurance contract liabilities end at the earlier of:
      a. The first renewal or adjustment date at or after balance sheet date
      b. The renewal or adjustment date after the balance sheet date that maximizes the insurance contract liabilities
   3. The actuary would extend the term only to:
      a. Permit recognition of cash flow to offset acquisition or similar expenses
      b. Permit reflection of hedging arrangements related to seg fund guarantees by considering both the value of liability and its associated hedge

C. Policy Owner Reasonable Expectations
   1. The insurer's policies define contractually its obligations to its policy owners. The contractual definition may leave certain matters to the insurer's discretion, such as:
      a. Determination of policy dividends
      b. Experience rating refunds
      c. Retrospective commission adjustments
      d. Right to adjust premiums
   2. Policy owner reasonable expectations are expectations that:
      a. May be imputed to policy owners as reasonable expectations of the insurer's exercise of discretion
      b. Arise from insurer's communication in marketing, administration, pass practice, general standards of market conduct, etc.
   3. If the insurers makes a change that alters policy owner reasonable expectations, appropriate disclosure and communication should be provided.

D. Policy Dividends
   1. Selected policy dividend scales in a particular scenario would be consistent with other elements of that scenario.
   2. If current dividend scale anticipates a future deterioration in experience, then the actuary would assume continuance of that scale in response to that deterioration.
   3. An assumption of cash dividends to all policy owners is appropriate only if the alternative options to cash have equivalent value.

E. Forecast of Cash Flow
   1. To calculate insurance contract liabilities, the actuary would allocate assets to liabilities at the balance sheet date, forecast cash flows and adjust the allocated assets so that they reduce to zero at the last cash flow.

F. Income Tax and Alternative Tax
   1. The forecast from tax cash flows would take account of positive or negative tax as a result of permanent and temporary differences at or after the balance sheet date.
   2. An example of a temporary difference for tax purposes is a difference between insurance contract liabilities and the corresponding tax liabilities.
   3. An example of a permanent difference is a preferential tax rate on the investment income on an asset class.

G. Adoption of a Scenario
   1. If the selection of scenarios is deterministic, the actuary would adopt a scenario whose liabilities are within the upper range of the liabilities for the selection scenario
   2. If the selection of scenarios is stochastic, the actuary would adopt a scenario whose liabilities are within the 60^{th} and 80^{th} percentile

III. Scenario Assumptions: Interest Rates

A. General Considerations
   1. An interest rate scenario comprises of:
      a. An investment strategy
      b. An interest rate for each risk-free (RF) assets and a default premium
   2. Each interest rate scenario includes an assumption for inflation rate that is consistent with the scenario.
   3. The investment strategy defines reinvestment and disinvestment practice for each type, default risk classification, and term of the invested assets.

B. Base Scenario
   1. Base scenario interest rates would be based on insurer's current investment strategy:
      a. RF rate would equal the forward interest rates implied by the equilibrium RF market curve for the first 20 years after the balance sheet date
      b. After 40th year, RF rate would equal to the sum of ½ of the 60-month and 120-month moving averages of historic long-term Canadian RF bond yields (series V122544), annualized and rounded to nearest 10 bps
      c. Between 20th and 40th year, forward RF rate would be linearly interpolated
   2. The PfAD for interest rate risk is measured as the difference between the reported insurance contract liabilities and the liabilities of the base scenario.

C. Prescribed Scenarios
   1. The prescribed scenarios apply to debt investments acquired or sold after the balance sheet date.
   2. The prescribed scenarios provide guidance on interest rates for sale and purpose of investment and on the type and term of investments purchased, but provide no guidance on the type and term of investments sold.
   3. The prescribed range of short-term RF rate for the ultimate forecast period (current reinvestment rate, or CRR) is calculated as:
      a. Lower bound: min(3%, 90% of sum of ½ of 60-month and 120-month moving averages of historic 91-day Canadian RF rate, series V122531)
      b. Upper bound: max(10%, 110% of sum of ½ of 60-month and 120-month of V122531
   4. The prescribed range of long-term RF rate for the ultimate forecast period (ultimate reinvestment rate, URR) is calculated as:
      a. Lower bound: min(5%, 90% of sum of ½ of 60-month and 120-month moving averages of V122544)
      b. Upper bound: max(12%, 110% of sum of ½ of 60-month and 120-month moving averages of V122544)
   5. The width of the prescribed range is exactly 7%.

D. Prescribed Scenarios (PS)
   1. PS 1 RF rate is determined by:
      a. First year: 90% of the RF rate at balance sheet date
      b. At and after 20 years: lower bounds of the short-term and long-term rates
      c. Between the 1st and 20th year: uniform transition

Question 2

(5 points)

(a) What are the risk components captured in Risk-Based Capital (RBC) framework? (2 points)

(b) Given the following information, calculate the RBC Ratio. (2 points)

Asset valuation reserve = \$150MM
Policyholder dividend liabilities = \$20MM
Capital = \$800MM
C_0 = \$25MM
C_{1a} = \$75MM
C_{1cs} = \$300MM
C_2 = \$700MM
C_{3a} = \$50MM
C_{4a} = \$30MM

(c) What is target surplus? How is it different from risk-based capital? (1 point)

Question 3

(8 points)

(a) Compare and contrast the three basic methods of reinsurance: YRT, Coinsurance, and Modified Coinsurance (3 points)

(b) Compare and contrast the three advanced methods of reinsurance: Funds Withheld Coinsurance, Fund Withheld Modified Coinsurance, and Partially Modified Coinsurance (3 points)

(c) What are the conditions that should be included in reinsurance treaties to satisfy risk transfer? (2 points)

Question 1 – Solution

(6 points)

Points	Statement
3	(a) The two approaches are: liability runoff approach and one-year mark-to-market
1	approach
1	- Liability runoff approach removes reliance on management scenario selection, but can be relatively difficult to explain and easily misunderstood
1	- One-year mark-to-market approach gives strong recognition to the fact that a company's principle ability to control risk in the short term is through trading assets/liabilities, but it is reliant on the management's scenario selection
3	(b) Uses of Economic Capital include:
1	1. Capital adequacy: EC captures the true risk of the insurer's business
1	2. Risk monitoring and control: use EC to monitor against preset target ranges for monitoring risk
1	3. Performance measurement and management: use EC in calculating the RORAC, inclusion of EC with the embedded value framework
1	4. Risk-based decision making: strategic asset allocation, asset/liability management based on EC requirement
1	5. Risk-based pricing: use of EC to drive product pricing
1	6. Business and strategic planning: use EC to assess the economic impact on capital requirements when considering business plans
1	7. Mergers and acquisitions: use of EC to assess the risk of merging or acquiring a business

***Source**: Economic Capital for Life Insurance Companies, SOA research paper. (Learning Objective 5)*

Question 2 – Solution

(5 points)

Points	Statement
2	(a) Risk-based capital model is broken down into 5 major risk categories: 1. Asset risk – affiliates 2. Asset risk – other 3. Insurance risk 4. Interest rate risk, health risk and market risk 5. Business risk
2 0.5	(b) RBC Ratio = Total Adjusted Capital / Authorized Control Level Risk-Based Capital
0.5	Total adjusted capital = Capital + Asset valuation reserve + 0.5×Policy dividend liabilities = \$960MM
0.5	$ACL\ RBC\ = 0.5\times\left[C_0 + C_{4a} + \sqrt{(C_{1a} + C_{3a})^2 + C_{1cs}^2 + C_2^2}\right]$ = \$413.38MM
0.5	RBC Ratio = \$960MM / \$413.38MM = 232.23%
1	(c) Target surplus is the company's planned excess capital over and above the minimum risk-based capital amount. Usually target surplus is set at more than two to three times the minimum RBC.

***Source**: Valuation of Life Insurance Liabilities, Lombardi, 4th edition, Chapter 16 (Learning Objective 5)*

Question 3 – Solution

(8 points)

Points **Statement**

3

(a) Comparison amongst the 3 basic reinsurance methods:

	Advantages	**Disadvantages**
YRT	• Use of YRT limits the reinsurer's investment and lapse risk • YRT usually has a lower cost than any form of coinsurance	• Low cost limits the amount of possible future profits and amount of ceding commission the reinsurer can provide
Coinsurance	• Simplest form to administer if a quota share method is used • Pure coinsurance is the cleanest form of reinsurance, hence fewer questions regarding risk transfer from a regulatory viewpoint	• The need to transfer assets • Reinsurer is required to manage assets, thus increasing investment risk • If reinsurer is not registered in the ceding company's state of domicile, ceding company cannot take credit for reserves held by the reinsurer • Ceding company is subjected to additional credit risk
Mod-co	• Avoids unnecessary transfer of assets to reinsurer • Eliminates reserve credit issue found in coinsurance • Reinsurer does not need to manage assets	• Complicated to administer because of the Mod-co adjustment • Transfer of assets back to reinsurer when treaty is terminated creates capital losses for ceding company • Reinsurer is subjected to credit risk

3

(b) Comparison amongst the 3 advanced reinsurance methods:

	Advantages	**Disadvantages**
Funds Withheld Coinsurance	• No cash changes hand in the initial transaction • Lessens the ceding company's insolvency risk • Legitimate alternative to Mod-co if funds stay with the ceding company	• More complicated than regular coinsurance • May result in a reserve credit problem for ceding company
Funds Withheld Mod-co	• Insurer retains the initial allowance • Reinsurer has a lessened risk if ceding company becomes insolvent	• It adds more complexity to policy admin
Part-co	• No cash transaction initially	• Complicated to understand and administer