

GH CORC Model Solutions

Spring 2018

1. Learning Objectives:

7. The candidate will understand and evaluate Retiree Group and Life Benefits in Canada

Learning Outcomes:

- (7f) Apply actuarial standards of practice to post-retirement and post-employment benefit plans.

Sources:

GHC-633-14 CIA Standards of Practice – Practice Specific Standards for Post-Employment Benefit Plans

Commentary on Question:

This question is testing whether candidates are familiar with the CIA Standards of Practice. Most candidates were able to get part marks throughout but few answered all portions thoroughly.

Solution:

- (a) List and provide examples of the benefit types that require an actuary's advice for funding or accounting of post-employment benefit plans.
- Long-term employee benefits (and compensated absences)
 - Long service leave or sabbatical leave, jubilee or other long-service benefits, long-term disability benefits, and profit sharing, bonuses, and other deferred compensation such as retiring allowances that are to be paid far enough into the future to be considered to be a post-employment benefit (long-term employee benefits would generally include benefits that commence or continue to be payable more than 12 months after the initial incident that caused the benefit to be paid; for example, long-term disability benefits)
 - Short-term employee benefits (and compensated absences) that accumulate or vest
 - Accumulated sick days or vacation days that can be saved in one period and drawn or paid out in another period
 - Benefits to which plan members become entitled when they are no longer actively at work, such as post-employment life insurance or post-employment health care

1. Continued

- Termination benefits payable to an employee as a result of termination of employment, if some or all of the benefits are payable on or after the date of termination of employment
- (b) List the types of actuarial advice an actuary may give for post-employment benefits plans.
- Required or recommended funding of the plan
 - Projected cash flows of the plan with or without future new entrants
 - Determination of the actuarial present value of the projected or accrued benefits of the plan with or without future new entrants
 - Determination of the obligations for reporting in the employer's financial statements, or the plan's financial statements, or the financial statements of a trust associated with the plan
- (c) You have been asked to provide actuarial advice on the funding of a post-employment benefits plan.
- (i) Describe three actuarial cost methods that could be used for this purpose.
- (ii) List two types of asset valuation methods that could be used for this purpose.
- (iii) List information sources that can be used to determine plan provisions of the benefit types to be valued.
- (i)
- Cost allocation methods, which allocate the actuarial present value of projected benefits among time periods, including attained age, entry age, aggregate and individual level premium
 - Benefit allocation methods, which allocate a portion of the actuarial present value of projected benefits to a time period, including the accrued benefit, unit credit and projected unit credit
 - Forecast actuarial cost methods, which allocate a portion of the actuarial present value of projected benefits to the forecast period based on:
 - The actuarial present value, at the calculation date, of projected benefits at the end of the forecast period, including, if appropriate, benefits for those who are expected to become members between the calculation date and the end of the forecast period;
MINUS

1. Continued

- The actuarial present value of projected benefits at the calculation date;
PLUS
 - The actuarial present value, at the calculation date, of benefits expected to be paid during the forecast period.
- (ii)
- Market value adjusted to moderate volatility in investment returns
 - Present value of asset cash flows after the calculation date
- (iii)
- Current plan documents
 - Funding or underwriting arrangements
 - Collective bargaining agreements
 - Information regarding past practices (including prior valuation reports)

2. Learning Objectives:

6. Evaluate the impact of regulation and taxation on companies and plan sponsors in Canada.

Learning Outcomes:

- (6c) Understand the impact of taxation of both insurance companies and the products they provide.

Sources:

Canadian Handbook of Flexible Benefits, 3rd Edition, McKay Ch. 12 Taxation of Flexible Benefits (12.1 – 12.4 only)

Benefits Legislation in Canada 2015

Commentary on Question:

This question tests the taxation of benefits and flexible plan design. See commentaries in part a) and part b) for more details.

Solution:

- (a) Calculate the expected total cost for calendar year 2018. State any assumptions and show your work.

Commentary on Question:

Candidates have generally done well on this part of the question. Almost all candidates have clearly stated their trend assumptions for medical and dental. Most candidates correctly calculated the expected net claims cost for 2018. Some candidates missed applying the admin charges, and/or missed loading for sales tax and premium tax in Ontario.

Other reasonable trend assumptions are also acceptable. For illustration purposes, assume medical trend of 10% per annum, and dental trend of 6% per annum. Note that the total cost is shown in the solution below, but per employee per year answers are also acceptable.

	Medical	Dental	EEs	Sales Tax	Premium Tax
AB	1,300	1,050	300	0%	N/A on ASO plans
ON	1,200	900	200	8%	2%
Trend	10%	6%			
Expenses	7%	6%			

2. Continued

2018 Expected Plan Cost - Alberta

AB	2016 Claims Cost	Trend Claims to 2018	Load Exp	Load Tax
Medical	390,000	471,900	504,933	504,933
Dental	315,000	353,934	375,170	375,170

2018 Expected Plan Cost - Ontario

ON	2016 Claims Cost	Trend Claims to 2018	Load Exp	Load Tax
Medical	240,000	290,400	310,728	342,298
Dental	180,000	202,248	214,383	236,164

2018 Expected Plan Cost

	Total
Medical	847,231
Dental	611,334

- (b)
- (i) Evaluate the proposed premium and price tag structure.
 - (ii) Explain the most tax-efficient allocation of flex credits for each employee.
 - (iii) Calculate the total employee cost based on your response from (ii) above. State any assumptions and show your work.
 - (iv) Describe the methods permitted to handle unused credits and excess claims under an HSA.

2. Continued

Commentary on Question:

Most candidates were able to evaluate the proposed premiums and price tag structure appropriately and allocate the flex credits in the most tax-efficient manner. For part i), any reasonable observation was given credit. In part iii), some candidates did not account for taxes in the calculation of the total employee cost. Part iv) of the question asked candidates to list and describe the possible methods to handle unused credits and excess claims. Almost all candidates correctly identified the credit roll-forward and claim roll-forward methods, but only a few candidates mentioned the no roll-forward approach.

Part i)

- Optional life rate is not graded by age or gender – could result in antiselection
- Three-tiered structure for medical/dental is appropriate to address antiselection
- Could question why couple coverage for dental is not twice single coverage
- Would need additional information to evaluate whether the relationship between Options A and B is appropriate (relative value of plan designs, expected enrollment)

Part ii)

Employee A

Most efficient tax allocation

Medical	450	funded through flex credits
Dental	300	funded through flex credits
Health Spending Account	250	funded through flex credits
Life insurance	1,080	Paid through payroll deduction

Reasons:

Flex credits used to upgrade health and dental coverage are not taxable. Credits used to fund the HSA are not taxable and can be used to pay for eligible medical/dental expenses that are not covered under the plan.

If flex credits are used to pay for life insurance, it will be considered taxable income which is no different than use payroll deduction to pay for life insurance premium.

2. Continued

Employee B

Most efficient tax allocation

Medical and dental	0	
Health spending account	200	funded through flex credits
Life insurance	648 (Alternatively 300)	funded through flex credits
Wellness account	152 (Alternatively 500)	funded through flex credits

Reasons:

Credits used to fund the HSA are not taxable and can be used to pay for eligible medical/dental expenses that are not covered under the plan.

If flex credits are used to pay for life insurance or wellness account, it will be considered taxable income which is no different than use payroll deduction to pay for life insurance premium.

For wellness account, employees are taxed when the credits are used to pay for any eligible claims.

Part iii)

Employee A

Annual Premium

Optional Life insurance annual premium	1,080 = $500000 * 0.18 / 1000 * 12$
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Most efficient tax allocation

Medical	450 funded through flex credits
Dental	300 funded through flex credits
Health Spending Account	250 funded through flex credits
	1,080
Optional Life insurance	Paid through payroll deduction

Taxable income from flex credits	0
Taxable income from basic life	$120 = 10/\text{month} \times 12 \text{ months}$
Taxable income from LTD	0
Total taxable income	120

Total EE cost	
- premiums	1,080
- tax	$36 = 120 \times 30\% \text{ tax rate}$
- total	1,116

2. Continued

Employee B

Optional Life insurance annual premium	648 = $300000 \times 0.18 / 1000 \times 12$
Most efficient tax allocation	
Medical and dental	0
Health spending account	200
Optional Life insurance	funded through flex credits 648 (Alternatively 300)
Wellness account	funded through flex credits 152 (Alternatively 500)
Taxable income from flex credits	800 = $648 + 152$ or $800 = 300 + 500$
Taxable income from basic life	120 = $10 / \text{month} \times 12 \text{ months}$
Taxable income from LTD	0
Total taxable income	920
Total employee cost	
- premiums	348 = $500 - 152$ in the wellness account
- tax	276 = $920 \times 30\%$ tax rate
- total	624

Part iv)

- No rollforward of either excess claims or unused expenses is the simplest method
- Unused credits may be rolled forward to next plan year
- Excess claims can be rolled forward to next plan year but only if credits were allocated to the HSA in the current plan year
- HSA balance (either claims or credits, but not both) can be rolled forward for a maximum of 12 months

3. Learning Objectives:

5. The candidate will understand how to prepare and interpret insurance company financial statements in accordance with IFRS & IAS.

Learning Outcomes:

- (5h) Construct basic financial statements and its actuarial entries for an L&H insurance company.

Sources:

CIA Educational Note Dynamic Capital Adequacy Testing and OSFI Guideline E18 Stress Testing

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) List the responsibilities of the Appointed Actuary with respect to DCAT.

Commentary on Question: The question is designed to test candidates' knowledge of stress testing and DCAT modeling requirements. To receive full points, candidate needs to show general understanding of the purpose of DCAT and Stress testing and successfully identify business risks related group insurance.

- The appointed actuary should make an investigation at least once during each financial year of the insurer's recent and current financial position, and financial condition, as revealed by DCAT testing for selected scenarios.
- The appointed actuary should make a report of each investigation in writing to the board of directors or chief agent for Canada. The report should identify possible actions for dealing with any threats to satisfactory financial condition that the investigation reveals.
- Should make an interim investigation if there's a material adverse change in the insurer's circumstances.
- Should ensure that the investigation is current. The investigation should take into consideration recent events and recent financial operating results of insurer.

- (b) Describe the goals of DCAT stress testing.

Commentary on Question:

Description is necessary for full marks. Candidates mostly mentioned risk identification and control but did not describe any other goals.

3. Continued

- **Risk identification and control**—stress testing may be included in an institution’s risk management activities at various levels, for example, ranging from risk mitigation policies at a detailed or portfolio level to adjusting the institution’s business strategy. In particular, it would be used to address institution-wide risks, and consider the concentrations and interactions between risks in stress environments that might otherwise be overlooked.
- **Providing a complementary risk perspective to other risk management tools**—stress tests would complement risk quantification methodologies that are based on complex, quantitative models using historical data and estimated statistical relationships. In particular, stress-testing outcomes for a particular portfolio can provide insights about the validity of statistical models at high confidence intervals; for example, those used to determine VaR.
- **Supporting capital management**—stress testing would form an integral part of institutions’ internal capital management where rigorous, forward-looking stress testing can identify severe events, including a series of compounding events, or changes in market conditions that could adversely impact the financial health of the institution.
- **Improving liquidity management**—stress testing would be a central tool in identifying, measuring, and controlling funding liquidity risks, in particular for assessing the institution’s liquidity profile and the adequacy of liquidity buffers in case of both institution-specific and market-wide stress events.

(c) List the basic requirements of a sound DCAT model.

Commentary on Question:

Most candidates answered well on this question.

- The model should reproduce key elements and pages from the financial statements
 - Balance Sheet: assets, liability, retained earnings/surplus
 - Income Statement: revenue, claims, expenses, income tax, preferred share dividends, investment income
 - Applicable regulatory measure of capital adequacy
- The model should be valid on an accounting basis.
 - Statement of Income = Cash flows + Change in balance sheet items
- Financial results would be consistent between various parts of the model and from year to year, for major items such as assets, liabilities and surplus.
- The model should be flexible to enable the appointed actuary to assess risks in each risk category.

3. Continued

(d) Construct the base scenario for Living Daylights' 2015 DCAT analysis, given the following assumptions:

- Premiums and other operating revenue are expected to grow 5% each year
- Non-operating revenues are expected to remain level as of 2014
- Benefit loss ratio (benefit expense/premiums) is expected to deteriorate by 1% each year for 3 years, then reach steady state
- Other expenses are expected to grow proportionally to premiums
- Income tax rate is expected to remain unchanged
- Living Daylights' business plan forecast period is 3 years

Show your work.

Commentary on Question:

Overall candidates did well on this part of the question. Note that DCAT requires minimum 5 years forecast period for typical life insurer (Pg 8 of CIA Ed Note). Most candidates provided a three year projection period only. Partial marks were given for those candidates who showed only a few years of forecast. Candidates also had trouble with deterioration of the benefit loss ratio, interpreting it the wrong direction.

	Given in Case study	Required calculation						Formula
		2014A	2015P	2016P	2017P	2018P	2019P	
Revenue								
	Premium	\$ 7,660	\$ 8,043	\$ 8,445	\$ 8,867	\$ 9,311	\$ 9,776	= Prior Yr * 1.05
	Other operating revenue	\$ 1,542	\$ 1,619	\$ 1,700	\$ 1,785	\$ 1,874	\$ 1,968	= Prior Yr * 1.05
	Other revenue	\$ 672	\$ 672	\$ 672	\$ 672	\$ 672	\$ 672	= Prior Yr
	Total Revenue	\$ 9,874	\$ 10,334	\$ 10,817	\$ 11,324	\$ 11,857	\$ 12,416	= Premium+ Other operating revenue + non operating revenue
Expense								
	Benefit expense	\$ 5,193	\$ 5,534	\$ 5,895	\$ 6,278	\$ 6,592	\$ 6,922	= Premium * Unit cost %
	Other expenses	\$ 2,386	\$ 2,505	\$ 2,631	\$ 2,762	\$ 2,900	\$ 3,045	= Prior Yr * 1.05
	Total Expense	\$ 7,579	\$ 8,039	\$ 8,525	\$ 9,040	\$ 9,492	\$ 9,967	= Benefit expense + Other expenses
	Unit cost (Benefit loss ratio)	67.8%	68.8%	69.8%	70.8%	70.8%	70.8%	= Prior yr +1%, level after 3 years
Income Before tax		\$ 2,295	\$ 2,295	\$ 2,292	\$ 2,284	\$ 2,365	\$ 2,449	= Total Revenue - Total Expense
Income Tax		\$ 1,251	\$ 1,251	\$ 1,249	\$ 1,245	\$ 1,289	\$ 1,335	= Tax Rate * Income Before Tax
Tax Rate		54.5%	54.5%	54.5%	54.5%	54.5%	54.5%	= 2014 Tax Rate
Net Income		\$ 1,044	\$ 1,044	\$ 1,043	\$ 1,039	\$ 1,076	\$ 1,114	= Income Before Tax - Income Tax

- (e)
- Describe two significant risks to capital adequacy for Living Daylights.
 - Describe plausible adverse scenarios to test each of the risks from (i), including possible ripple effects.

3. Continued

Commentary on Question:

Candidates did fairly well on this part. Candidates were able to identify risk and describe adverse scenarios based on the risk describe in (i). As Living Daylight's primary product is short term group health products, it's not exposed to significant cash flow risks or new business risks. However, candidates received credit if they provide reasonable descriptions and explanations.

(i) **Significant Risks:**

Based on the Case Study the company may be most susceptible to:

- **Morbidity Risk:** Increase in drug and dental costs and utilization
- **Expenses Risk:** High inflation and new technology development delivers significant cost
- **Alternative: Deterioration of Assets Value (C-1 Risk):** Drop in market values, poor asset returns, concentration risk.

(ii) **Adverse Scenarios and Ripple Effects:**

- **Morbidity Risk Scenario:** Increase in medical and dental incidence rates, and increase in medical and dental costs.

Consequences & ripple effects: Premium rate increases. However, pricing adjustments may be constrained due to rate guarantees, slow industry reaction, and underwriting cycle. And rate increases may increase anti-selective lapse (policyholder behavior), dampening intended effect of rate increases. Also, more active claims management could lead to reputation risk.

- **Expense Risk Scenario:** High inflation environment.

Consequences & ripple effects: Escalating operating expenses. Typically accompanied by high-interest rates. Premium rates could be raised, however need to consider competitiveness and anti-selective lapse (policyholder behavior).

4. Learning Objectives:

7. The candidate will understand and evaluate Retiree Group and Life Benefits in Canada.

Learning Outcomes:

- (7c) Determine employer liabilities, service cost and expense for post-retirement and post-employment benefits for financial reporting purposes under IFRS and understand differences compared to US GAAP.
- (7d) Describe funding alternatives for post-retirement and post-employment benefits.

Sources:

Case Study – ThunderBall (Pages 24 – 26) related to LTD, incidence tables and recovery

GHC 647 -15 (under LO 6) Policy Paper ASO LTD

Commentary on Question:

Overall, candidates did very well on part a but not well on parts b and c.

Solution:

- (a) Calculate the expected disability claims cost for the new division. Show your work.

Commentary on Question:

Almost all candidates did very well on this part of the question. Some candidates assumed the reserve factors given in the question were per \$100 monthly benefit which was acceptable.

Annual Expected Cost of Disability at a specific age & gender = Headcount *
Incidence rate on an annual basis * Reserve factor per \$1 monthly benefit *
\$4,000 monthly benefit

*Age 27 Males: $8 * 1.0/1,000 * 46 * 4,000 = \$1,472$*

*Age 27 Females: $10 * 1.0/1,000 * 53 * 4,000 = \$2,120$*

*Age 32 Males: $31 * 1.4/1,000 * 58 * 4,000 = \$10,068.80$*

*Age 32 Females: $25 * 1.6/1,000 * 65 * 4,000 = \$10,400$*

*Total Annual Expected Cost of Disability = $1,472 + 2,120 + 10,068.80 + 10,400$
= $\$24,060.80$*

Since the incidence rates provided in the Case Study were not explicitly stated to be on an annual basis, credits were provided to candidates who assumed they are on a monthly basis.

4. Continued

- (b) Calculate the monthly LTD premium rate (per \$100) Thunderball should charge for the new division. Show your work.

Commentary on Question:

As the question did not specify if the expense load was on premium or claims, candidates were given full credit for either assumption. Some candidates failed to incorporate the LTD volume into the premium rate calculation.

The annual expected cost of disability = \$24,060.80

Expense load = 10%, implying a target loss ratio of 90%

Expected monthly premium to cover the cost of disability = $24,060.80 / 12 / (1 - 0.10) = \$2,227.83$

Monthly LTD Volume = $\$4,000 * 74$ employees in total = \$296,000

Monthly LTD premium = Monthly Premium Rate per 100 * Monthly LTD Volume / 100

Monthly Premium Rate per 100 = Monthly LTD premium / Monthly LTD Volume * 100

Monthly Premium Rate per 100 = $2,227.83 / 296,000 * 100$

Monthly Premium Rate per 100 = \$0.753

- (c) In a subsequent discussion PowerPlay decides to self-insure disability claims for the first three years. Thunderball is asked to price an LTD policy that would cover disability claims starting with year four, up to the earliest of recovery, death or attaining age 65.

Assume male and female death & recovery probability is the same.

Assume death & recovery occurs mid-year.

Calculate the expected claims cost of this LTD policy. Show your work.

Commentary on Question:

Many candidates didn't take into account the multiplicative effects of death & recovery. Generally, candidates did better if they calculated the cost of self-insuring the first 3 years of the disability and then subtracted this from the lifetime fully insured benefit cost.

4. Continued

\$1 DLR factor for 3-year disability benefit for male age 27:

Note – discount rate is 0%

Decrement are assumed to happen at mid-year

Expected Benefit for 1st year:

$$\$1/\text{month} * 12 \text{ month} * (1 - 0.47/2) = \$9.18$$

Expected Benefit for 2nd year:

$$(1 - 0.47) * (\$1/\text{month} * 12 \text{ month} * (1 - 0.45/2)) = \$4.93$$

Expected Benefit for 3rd year:

$$(1 - 0.47) * (1 - 0.45) * (\$1/\text{month} * 12 \text{ month} * (1 - 0.34/2)) = \$2.90$$

$$\$1 \text{ DLR factor} = 9.18 + 4.93 + 2.9 = 17.0$$

\$1 DLR factor for 3-year disability benefit for female age 27:

Note: Female recovery & death is assumed to be the same as male in this question.

$$\$1 \text{ DLR factor} = 17.0$$

\$1 DLR factor for 3-year disability benefit for male age 32:

Expected Benefit for 1st year:

$$\$1/\text{month} * 12 \text{ month} * (1 - 0.44/2) = \$9.36$$

Expected Benefit for 2nd year:

$$(1 - 0.44) * (\$1/\text{month} * 12 \text{ month} * (1 - 0.4/2)) = \$5.38$$

Expected Benefit for 3rd year:

$$(1 - 0.44) * (1 - 0.4) * (\$1/\text{month} * 12 \text{ month} * (1 - 0.28/2)) = \$3.47$$

$$\$1 \text{ DLR factor} = 9.36 + 5.38 + 3.47 = 18.2$$

\$1 DLR factor for 3-year disability benefit for female age 32:

Note: Female recovery & death is assumed to be the same as male in this question.

$$\$1 \text{ DLR factor} = 18.2$$

4. Continued

The \$1 DLR factor from year 4 to age 65 is calculated as follows:

$$\text{Age 27 Male} = 46 - 17.0 = 29.0$$

$$\text{Age 27 Female} = 53 - 17.0 = 36.0$$

$$\text{Age 32 Male} = 58 - 18.2 = 39.8$$

$$\text{Age 32 Female} = 65 - 18.2 = 46.8$$

The Expected cost is calculated by applying the incidence on the DLR factors calculated above, accounting for headcount and the \$4,000 benefit level, similar to part (a)

$$\text{Age 27 Males} = 8 * 1.0/1,000 * 29.0 * 4,000 = \$928$$

$$\text{Age 27 Females} = 10 * 1.0/1,000 * 36.0 * 4,000 = \$1,440$$

$$\text{Age 32 Males} = 31 * 1.4/1,000 * 39.8 * 4,000 = \$6,909$$

$$\text{Age 32 Females} = 25 * 1.6/1,000 * 46.8 * 4,000 = \$7,488$$

$$\text{Annual cost of the new LTD policy} = 928 + 1,440 + 6,909 + 7,488 = \$16,765$$

5. Learning Objectives:

5. The candidate will understand how to prepare and interpret insurance company financial statements in accordance with IFRS & IAS.

Learning Outcomes:

- (5a) Interpret insurer financial statements from the viewpoint of various stakeholders.
- (5c) Project financial outcomes and recommend strategy to senior management to achieve financial goals.

Sources:

Higgins Ch4: Managing Growth

GHC-612-13: Simple CALM example

Commentary on Question:

The question required candidates to:

- Interpret insurer financial statements from the viewpoint of various stakeholders
- Project financial outcomes and recommend strategy to senior management to achieve financial goals

Solution:

- (a) Describe the steps of a successful company's life cycle.

Commentary on Question:

Almost all candidates did well on this part of the question.

Successful companies pass through the following life cycle:

- a) Startup – company loses money while developing products and establishing a foothold in the market
 - b) Rapid growth – company is profitable but is growing so rapidly that it needs regular infusion of outside financing
 - c) Maturity – growth declines and the company switches from absorbing outside financing to generating more cash than it can profitably reinvest
 - d) Decline – company is perhaps marginally profitable, generates more cash than it can reinvest, and suffers declining sales
- (b) Calculate the Balance Sheet position of Entire's closed block of business based on best estimate assumptions. Show your work.

Commentary on Question:

Candidates demonstrated lack of understanding of balance sheet (included asset cash flows and coupon payments). Many candidates incorporated the given present value of assets/liabilities in addition to calculating the present value of coupons and reserve cashflows.

5. Continued

('000s)	Assets	Liabilities and Surplus	
Invested Assets	2,600	Reserves	2,885
Cash	400	Surplus	115
Total	3,000	Total	3,000
<i>Total assets = asset + cash = liabilities (reserves) + surplus</i>			
<i>i.e., both sides must equal 3,000</i>			
<i>Surplus = 3,000 – 2,885 = 115</i>			
<i>i.e., solve for surplus so total liabilities & surplus equals total assets</i>			

- (c) The interest rate scenario to be used for Canadian Statutory filing is a one percentage point decrease from the best estimate interest rate.

Calculate the Interest Rate PfAD. Show your work.

Commentary on Question:

Most candidates performed (c) incorrectly, and did not demonstrate understanding of the study note. Candidates who took short cuts and demonstrated an understanding of concepts in fewer calculations were still given full points.

Part 1: calculate excess cash available to Entire's close block of business								
(000's)	Invested Assets		Short Term	Total	Reserve	Net	Interest	
	Cash flow	Cash	Cash flow	Cash flow	Cash flow	Cash flow	Cash flow	Rate
				= assets released + cash				
	(a)	(b)	(c) = (b) * (1 + int rate)	(d) = (a) + (c)	(e)	(d) - (e)		
2018	\$ 1,000	\$ 400	\$ 404	\$ 1,404	\$ 1,000	\$ 404	1%	
2019	\$ 1,000	\$ 404	\$ 408	\$ 1,408	\$ 1,100	\$ 308	1%	
2020	\$ 1,000	\$ 308	\$ 311	\$ 1,311	\$ 1,200	\$ 111	1%	
			Present value of excess cash flow after 3 years: = 111 / (1.01)^3			\$ 108		
BV	\$ 2,600							
Part 2: Remove the excess cash, and determine assets required to back reserves.								
Net cash flow at the end of the period should equal to 0								
Note this section is not required to receive full credit								
(000's)	Invested Assets		Short Term	Total	Reserve	Net	Interest	
	Cash flow	Cash	Cash flow	Cash flow	Cash flow	Cash flow	Cash flow	Rate
				= assets released + cash				
	(a)	(b)	(c) = (b) * (1 + int rate)	(d) = (a) + (c)	(e)	(d) - (e)		
2018	\$ 1,000	=400 - 108= \$292	\$ 295	\$ 1,295	\$ 1,000	\$ 295	1%	
2019	\$ 1,000	\$ 295	\$ 298	\$ 1,298	\$ 1,100	\$ 198	1%	
2020	\$ 1,000	\$ 198	\$ 200	\$ 1,200	\$ 1,200	\$ (0)	1%	

BV asset backing reserves or padded reserves:

$$= \$2,600,000 + \$292,000$$

$$= \$2,892,000$$

5. Continued

Interest Rate PfAD:

= Padded reserve – Best Estimate reserve

= \$2,892,000 – \$2,885,000 = \$7,000 (\$7,148 if not rounded)

Alternatively,

= Surplus using BE – Surplus using Pads

= \$115,000 – \$108,000 = \$7,000

Interest Rate PfAD = \$7,000

(d) Additional testing on Entire’s closed block determined the following:

- Morbidity PfAD = \$100,000
- Expense PfAD = \$20,000

Calculate the Balance Sheet position of Entire’s closed block of business based on padded assumptions. Show your work.

Commentary on Question:

Gave credit candidates carrying forward the incorrect Interest Rate PfAD

(‘000s)	Assets	Liabilities and Surplus	
Invested Assets	2,600	Reserves	3,012
Cash	400	Surplus	(12)
Total	3,000	Total	3,000
<i>Padded Reserves:</i>			
<i>= Best estimate reserves + PfADs</i>			
<i>= 2,885,000 + 7,000 + 100,000 + 20,000</i>			
<i>= 3,012,000</i>			
<i>Surplus</i>			
<i>= 3,000,000 – 3,012,000 = -12,000</i>			

(e) Recommend to Only Life’s Senior Management if they should or should not purchase the IDI business from Entire. Justify your response.

Commentary on Question:

Part (e), candidates did not do well in demonstrating the ability to assess business viability of IDI business.

5. Continued

Recommend they should buy the block from Entire Disability.

- The block is projected to be profitable under Best Estimate assumptions
- An infusion of capital is required if they acquire this block under Canadian Statutory Law
- Only Life is looking to expand its business
- Acquiring this block gains market share, and expertise in the disability business

Response does not need to be exactly as above, however should cover the 1) profitable under best estimate, and 2) need to infuse capital.

6. Learning Objectives:

4. The candidate will understand how to describe Government Programs providing Health and Disability Benefits in Canada.

Learning Outcomes:

- (4a) Describe eligibility requirements for social programs in Canada and the benefits provided.
- (4b) Describe how private group insurance plans work within the framework of social programs in Canada.

Sources:

Morneau Shepell 15th Ch. 17

GHC-600-16

Commentary on Question:

The question is testing candidate's understanding on eligibility requirements for employee insurance reduction program in Canada and ability to perform calculation to compare employer cost with or without EI premium reduction by offering a qualified STD plan. Overall, the candidates have done well on this question especially for the calculation part, but very few have considered the savings that need to be shared with the employees.

Solution:

- (a) List the minimum requirements an employer must satisfy to qualify for the EI Premium Reduction program.
 - Disability benefits that are at least equal to the EI sickness benefits (i.e., 55% of insurable earnings)
 - Payment of benefits starting on or before the 15th day of disability (Alternative point: New legislative change effective January 1, 2017, starting on or before 8th day of disability)
 - In case of weekly indemnity plans, payment of benefits for at least 15 weeks of each disability occurrence
 - Eligibility to claim benefits within three months of continuous employment
 - 24 hour coverage
 - Designation of the plan as the first payer (preventing plan benefits from being integrated and/or coordinated with EI benefits)
 - In case of weekly indemnity plans, reinstatement of full disability coverage after a disability within one month of return to work for future disabilities not related to the initial disability cause, and within three months of return to work for a recurrence of the initial disability cause

6. Continued

- (b) Describe acceptable ways the savings in EI Premium Reduction must be shared between the employer and employees.

Commentary on Question:

None of the candidates were able to provide the full list.

- At least 5/12 of the premium reduction must be returned, directly or indirectly, to the employees
 - A written mutual agreement on how the savings will be returned to the employees
 - A cash rebate equal to 5/12 of the savings divided amongst the employees, which is treated as employment income subject to source deductions (i.e., EI, CPP/QPP)
 - Providing new or increased benefits, including upgrading existing benefits, or providing more holidays or time off work
- (c) Calculate the change in cost to Best Business to implement the new STD Plan. Show your work.

Commentary on Question:

The candidate needs to compare the total employer cost under the following 2 scenarios:

1. *no STD plan, Best Business only pays for EI premiums*
2. *with STD plan, Best Business pays for both STD and EI premiums, but will also acquire savings due to EI premiums reduction, which needs to be shared with employees (5/12 of the total savings).*

Under Scenario 1:

Employer Cost Analysis

No STD Plan						
Employee Name	EI Insurable Salary (A)	EE EI Premium Rate (B)	ER Premium Rate Factor (C)	ER EI Premium Rate (D) = (B) * (C)	ER EI Annual Premium (E) = (A) * (D)	
Brad	\$50,000	1.63%	1.4	2.282%	\$1,141.00	
Beverley	\$51,300	1.63%	1.4	2.282%	\$1,170.67	
Bianca	\$51,300	1.63%	1.4	2.282%	\$1,170.67	
Boris	\$45,000	1.63%	1.4	2.282%	\$1,026.90	
Brian	\$51,300	1.63%	1.4	2.282%	\$1,170.67	
Total	\$248,900				\$5,679.90	

The total employer cost under scenario 1 is \$5,679.90

6. Continued

Under Scenario 2:

Note that Best Business now pays a lower EI premium rate of 2.282% - 0.50% = 1.782%.

With STD Plan							
Employee Name	Annual Salary (A)	EI Insurable Salary (B)	ER EI Premium Rate (C)	ER EI Annual Premium (D) = (B) * (C)	Weekly STD Volume of Insurance (E) = MIN((A)/52 * 60%, 850)	Monthly STD Premium Rate (F)	Monthly STD Premium (G) = (E) / 10 * (F)
Brad	\$50,000	\$50,000	1.782%	\$891.00	\$577	\$2.25	\$129.81
Beverley	\$60,000	\$51,300	1.782%	\$914.17	\$692	\$2.25	\$155.77
Bianca	\$85,000	\$51,300	1.782%	\$914.17	\$850	\$2.25	\$191.25
Boris	\$45,000	\$45,000	1.782%	\$801.90	\$519	\$2.25	\$116.83
Brian	\$90,000	\$51,300	1.782%	\$914.17	\$850	\$2.25	\$191.25
Total				\$4,435.40			\$784.91

The Annual employer EI Premium savings = \$5,679.90 - \$4,435.40 = \$1,244.50
 Of that, 5/12 needs to be shared back with employers, which is \$1,244.50 * 5/12 = \$518.54

The annual STD premium = \$784.91 * 12 = \$9,418.85

The total employer cost under Scenario 2 is therefore:

Reduced EI Premium + STD Premium + Share of EI premium reduction payable to employee

$\$4,435.40 + \$9,418.85 + 518.54 = \$14,372.79$

Total employer cost under Scenario 1	\$5,679.90
Total employer cost under Scenario 2	\$14,372.79
Total increase in employer cost due to introduction of STD plan	\$8,692.89

- (d) Assess from an employer cost perspective whether it is in Best Business' interest to amend the STD Plan to maintain their EI Premium Reduction or to maintain their current STD plan. Show your work and justify your response.

Commentary on Question:

As a result of the EI benefit change, the employer needs to modify its STD benefit in order to continue to qualify for premium reduction.

6. Continued

The candidate needs to compare the total employer cost under the following scenarios:

- 1. Modify the STD plan to remain eligible for EI premium savings*
- 2. Do not modify the STD plan and lose the EI premium savings*

It is important to note that EI premium rates and employees salary level are not changing. So we can leverage the numbers already calculated in part c of this question.

Scenario 1

Annual employer EI Premium with reduction (from 2c)	\$4,435.40
Annual EI premium savings transferred to employers (from 2c)	\$518.54
Annual STD Premium under Revised STD Plan including 10% premium rate adjustment (\$9,418.85x 1.10)	\$10,360.73
Total Annual Employer EI and STD Cost under Revised STD Plan	\$15,314.67

Scenario 2

Annual Employer EI Premium <u>without</u> reduction (From 2c)	\$5,679.90
Annual EI premium savings transferred to employers	\$0
Annual STD Premium under existing STD Plan (from 2c)	\$9,418.85
Total Annual Employer EI and STD Cost under current STD Plan	\$15,098.74

Conclusion: it is more cost effective to maintain the current STD plan and not receive EI premium reduction.

If candidates compared the premium increase ($10\% * 9418.85 = 942$) vs. the EI premium reduction ($1244.50 - 518.54 = 725.96$) equivalent marks will be given

7. Learning Objectives:

6. Evaluate the impact of regulation and taxation on companies and plan sponsors in Canada.

Learning Outcomes:

- (6a) Describe the regulatory and policy making process in Canada
- (6b) Describe the major applicable laws and regulations and evaluate their impact.

Sources:

GHC_647_15

GHC_659_16

GHC_660_16

Commentary on Question:

Candidates generally did well on this question. Additional commentary below in respect of how candidates needed to respond for full marks.

Solution:

- (a) Describe common reasons that plan sponsors may prefer self-insured LTD plans over an insured arrangement.
- Cost savings – largely perception only
 - Timing of cashflows – in insured arrangement, reserves are established up front (versus pay-as-you-go for uninsured plans), but over the lifetime of the plan these reserves are an asset
 - Earn greater return on funds – insurers tend to invest more conservatively
 - Preferential tax treatment in certain provinces
- (b) Draft an email to Kluane's CFO that includes the following:
- (i) Explain the primary concern(s) that the insurance industry has with self-insured LTD plans.
- (ii) Outline possible government policy solutions to address these concerns.
- (iii) Describe any existing legislation that would impact Kluane's decision.

Commentary on Question:

No marks were attributable to the style of email writing. For (i), many candidates identified bankruptcy concerns only. For full marks for (ii), candidates were required to note concerns where the possible government policy solution would not address. For (iii), many candidates identified Ontario's 2014 budget changes only.

7. Continued

(i)

- Pay-as-you-go plans rely on the plan sponsor being able to continue to generate adequate cash flow each year over the lifetime of the plan and for the duration of the benefit period of any disabled employees to pay benefits
- In times of financial stress it can be challenging for plan sponsors to continue to support their LTD commitments
- In the event of bankruptcy or insolvency, there are often no funds set aside to continue paying benefits into the future
- Disability liabilities are “unsecured debts” in the wind up of a company

(ii)

- Enhanced disclosure requirements: help employees to understand that their LTD plans are not insured, as well as the implications that has for their financial security
 - However, this does not address the issue of protecting the benefits of these employees
- Increased priority status of disabled employees during bankruptcy: increase the likelihood that disabled employees get access to any available funds in a bankruptcy proceeding
 - However, does not ensure that there are in fact funds available in the event of an employer’s bankruptcy
- Require plan sponsors to establish reserves under a separate disability fund: requires provinces to establish some form of substantive regulatory and supervisory framework for uninsured benefit plans (could be similar to current framework for defined benefit pension plans)
 - Will not fully protect LTD claimants in the event of a plan sponsor bankruptcy
- Require that LTD plans be offered on an insured basis: provides maximum protection for disabled employees and ensures they are paid, regardless of their plans sponsor’s financial status
 - Already a robust regulatory and supervisory framework in place
 - Protects LTD claimants even in event of insurer insolvency (Assuris)

(iii)

- Alberta: requires plan sponsors that provide employee benefit plans for income replacement to disclose to the plan participants, prior to or at the time that the benefits are offered, that the benefits are not underwritten by an insurer and are supported solely by the financial resources of the company

7. Continued

- BC: provides that insurance licensing requirements do not apply to “plan sponsors” that provide uninsured employee benefits, on the condition that the plan sponsor discloses in writing to its employees that the employee benefits are not insured and that the plan sponsor is not subject to insurance licensing regulation
 - Ontario: 2014 budget prohibits employers from self-insuring LTD benefits in ON that are not provided through a licensed insurer
- (c) Assess the impact of the change in benefit for each of the following employees:
- John works in Alberta. His annual salary is \$130,000.
 - Ed works in Ontario. His annual salary is \$45,000.
 - Mel works in BC. His annual salary is \$90,000. He broke his leg and began collecting short term disability benefits on December 1, 2017; however, he expects to be back to work by February 1, 2018.

Show your work and justify your response.

Commentary on Question:

Candidates generally did very well on this question. For full marks, candidates were required to identify tax and elimination period impacts as well. Candidates were expected to make an assumption on the tax rate in order to quantify the tax impact.

John:

- Under prior Alberta policy, John is eligible for $66.67\% \times (\$130,000 / 12) = \$7,223$ but capped at \$6,000 per month
- Under new policy, John is eligible for $66\% \times (\$130,000 / 12) = \$7,150$ but capped at \$5,000 per month
- No tax impact
- Longer elimination period

Ed:

- Under prior Ontario policy, Ed is eligible for $70\% \times (\$45,000 / 12) = \$2,625$
- Under new policy, Ed is eligible for $66\% \times (\$45,000 / 12) = \$2,475$
- Under new policy, benefit is taxable which further reduces the net disability income
 - For example, assuming a 25% tax rate Ed would receive $\$2,475 \times (1 - 25\%) = \$1,856.25$, a reduction of almost 30%
- Same elimination period

7. Continued

Mel:

- Under prior BC policy, Mel is eligible for $60\% \times (\$90,000 / 12) = \$4,500$
- Under new policy, Mel is eligible for $66\% \times (\$90,000 / 12) = \$4,950$
- This change will only apply if Mel returns to work as expected after his STD claim
 - If Mel remains disabled, or if his disability recurs, his benefits will be calculated based on the original BC policy
- No tax impact
- Same elimination period

8. Learning Objectives:

1. The candidate will understand how to describe plan provisions typically offered under:
 - a. Group and individual medical, dental and pharmacy plans
 - b. Group and individual long-term disability plans
 - c. Group life short-term disability plans
 - d. Supplementary plans, like Medicare Supplement
 - e. Group and Individual Long Term Care Insurance

5. The candidate will understand how to prepare and interpret insurance company financial statements in accordance with IFRS & IAS.

Learning Outcomes:

- (1b) Describe each of the coverages listed above.
- (5h) Construct basic financial statements and its actuarial entries for an L&H insurance company.

Sources:

(LO1) Individual Health Insurance, Leida, 2nd Edition, 2015, Ch. 2, The Products

(LO5) GHC-620-13: Educational Note on Source of Earnings Calculations – Group Life and Health

(LO5) GHC-640-15 CIA Research paper on IFRS Disclosure requirements for Life Insurers 37(c)

Commentary on Question:

Candidates did well on part a but did poorly on parts b and c.

Solution:

- (a) List and describe the types of business protection coverage.

Commentary on Question:

This question was done well by almost all candidates.

Key Person Coverage

- Sold to businesses to financially protect them from the loss of a "key person" becoming disabled
- Key Person may be founder or senior partner

Disability Buyout Coverage

- When there are multiple partners or owners of a business, coverage pays for the ability to buy out one of their partner's ownership interest, in the event for that partner becomes disabled.

8. Continued

Business Overhead Expense (BOE):

- Usually purchased by small business owners
Insurance to be able to continue to cover a business' overhead expenses (not including personal income) in the event of their disability.

(b) Outline the IFRS 4 disclosure requirements for:

- Assumptions
- Effect of changes in assumptions

Commentary on Question:

Most candidates failed to focus on IFRS 4 requirements.

Required disclosure for assumptions:

- types of assumptions that are used
- description of the assumption
- how assumptions are delineated (sex, smoker, duration)
- how those assumptions are determined (internal studies, industry, pricing)
- frequency of review of those assumptions
- how changes are made
- purpose of margins,
- how those margins are set
- reflection of income taxes and tax timing differences, and
- calculation of reinsurance asset.

Required disclosure for effect of changes in assumptions:

- discussion of each change
- reason for change
- impact of each change, and
- observed trends.

(c) Construct the Source of Earnings Analysis for 2017, using the Income Statement lines, and the following categories:

- Experience Gain/Loss,
- Assumption Changes, and
- Investment Gain/Loss.

Show your work.

8. Continued

Commentary on Question:

Most candidates did not create an actual to expected income statement to determine all gain and loss items. Additionally almost all candidates failed to classify the sources of gain and loss correctly.

	Expected I/S	Actual	Experience Gains/ (Losses)	Assumption Changes Gains/ (Losses)	Investment Gains/ (Losses)
Premiums					
- Premiums	300,000	300,000			
- Investment Income	60,000	54,000			(6,000)
Total	360,000	354,000			(6,000)
Claims					
- Benefits paid	250,000	350,000	100,000		
- Change in Reserves	50,000	400,000	(50,000)	400,000	
- Operating Expenses (2% of benefits paid)	5,000	8,000	3,000		
- Commissions (10% of premium)	30,000	30,000			
- Premium Tax (2% of premium)	6,000	6,000			
Total	341,000	794,000	53,000	400,000	
Net Income	19,000	(440,000)	(53,000)	(400,000)	(6,000)

9. Learning Objectives:

2. The candidate will calculate and recommend a manual rate for each of the coverages described in Learning Objective 1.
3. Evaluate and recommend an employee benefit strategy.

Learning Outcomes:

- (2a) Identify and evaluate sources of data needed pricing, including the quality, appropriateness and limitations of each data source.
- (2b) Develop an experience analysis.
- (2c) Calculate and recommend assumptions.
- (2d) Calculate and recommend a manual rate.
- (2e) Identify critical metrics to evaluate actual vs. expected results.
- (3c) Recommend an employee benefit strategy in light of an employer's objectives.

Sources:

Study Note: GHC-108-17

http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2015/rwjf423764

Group Insurance, Skwire, Chapter 21

Commentary on Question:

This question tested the candidates' knowledge of small employer coverage options and required calculation of employer specific premium rates.

Solution:

- (a)
 - (i) Compare and contrast features of grandfathered and grandmothered plans.
 - (ii) Recommend and describe appropriate coverage financing options for Employer A and Employer B. Justify your response.

Commentary on Question:

Part (i): Most candidates wrote some of the features of grandfathered and grandmothered plans, however few were complete.

Part (ii): The candidates that understood what was being asked generally did well connecting the options to the risk tolerance of the employers. The word "financing" seemed to confuse some candidates. Responses involved employer and member contribution strategies or financial investment instruments (stocks, bonds, etc.).

9. Continued

Part (i)

- Both grandfathered and grandmothered plans are non-ACA-compliant/exempt from ACA
- Grandfathered plans were in existence before ACA was enacted in March 2010 while grandmothered plans were renewed in 2013 before ACA's primary benefit and rating reforms became effective
- Grandfathered plans are allowed to exist indefinitely, while grandmothered plans are allowed to exist until 2017 (or 2018 is acceptable- source Government Affairs Alert - February 23, 2017)
- To retain status, no material changes to plan design are allowed

Part (ii)

- Coverage options recommended for Employer A: Fully insured or group purchasing arrangement (association health plan or multiple employer welfare arrangement)
- These options are appropriate for Employer A (risk averse) because insurer takes on the risk
- Coverage option recommended for Employer B: Self-funded/Self-insured, can include stop-loss and admin services
- Appropriate for Employer B (risk willing) because the employer takes on the risk instead of insurer

- (b) Your boss has asked you to calculate a Small Group premium rate for Employer A and for Employer B as they move to ACA compliant plans.
- (iv) Recommend which historical claims data to use in calculating the manual base rate. Justify your response.
- (v) Calculate the manual base rate for 2018 using a trend rate developed from your recommended historical claims data from (b)(i), assuming that the rating variables remain the same in the experience and projection periods. Show your work.
- (vi) Develop separate 2018 premium rates for Employer A and Employer B, assuming 15% retention. Show your work.
- (vii) Determine whether Employer A or Employer B is more profitable to SHI in 2018. Show your work and justify your response.

Commentary on Question:

Part (i): Most candidates correctly identified that the AnyState data should be used, but very few wrote the ACA requirement of using a single-risk pool within a state as the justification.

9. Continued

Parts (ii)/(iii): Most of the calculations are multiplicative, therefore order isn't too important. A common mistake was including gender and health status as rating factors even though the ACA doesn't allow them. Including a factor of 1.0 was an issue at times because candidates could get the correct answer even if the factor was incorrectly included.

Part (iv): Candidates often trended each employer's experience to project claims despite saying in Part a (ii) that it wasn't credible. Candidates did well if they mentioned the differences in claims factors that aren't allowed in rating (gender/health status). Some candidates included commentary on risk adjustment, which wasn't intended to be tested here.

Part (i)

Use SHI AnyState Small Group Block experience for both. Under the ACA, estimated costs for an insurer's small group population must be calculated based on an insurer's entire book of small group business within a given state (that is, a "single-risk pool").

Part (ii)/(iii)

Normalize 2016 PMPM for Rating Variables (Gender and Morbidity not allowed by ACA)

$$=211,000,000/62,000/12= 283.60$$

$$=283.60/.98(\text{Age})/.99(\text{Area})/.98(\text{Benefit}) = 298.28$$

Calculate Trend as 2016 AnyState PMPM/2015 AnyState PMPM

$$=283.60/254.17 - 1 = 11.58\%$$

Trend normalized PMPM two years = $298.28*(1.1158)^2 = 371.36$ Manual rate

Employer Specific Premium = $371.36 \text{ Manual Rate} * \text{Age} * \text{Area} * \text{Benefit Plan} / \text{Retention}$

$$\text{Employer A} = 371.36*1.05*1.10*0.94/(1-0.15) = 474.34$$

$$\text{Employer B} = 371.36*1.02*1.11*0.97/(1-0.15) = 479.82$$

Part (iv)

To project claims, include all available factors.

Aggregate factor = $\text{Age} * \text{Gender} * \text{Area} * \text{Benefit Plan} * \text{Health Status}$

$$\text{Employer A} = 1.05*0.98*1.10*0.94*1.20 = 1.28$$

$$\text{Employer B} = 1.02*1.02*1.11*0.97*1.10 = 1.23$$

Employer B is projected to be more profitable. The aggregate rating factor is lower for B, but the premium is higher due to neither accounting for health status/gender (non-allowable). So higher premium rate and lower projected claims result in more expected profit.

10. Learning Objectives:

1. The candidate will understand how to describe plan provisions typically offered under:
 - a. Group and individual medical, dental and pharmacy plans
 - b. Group and individual long-term disability plans
 - c. Group short-term disability plans
 - d. Supplementary plans, like Medicare Supplement
 - e. Group and Individual Long Term Care Insurance

Learning Outcomes:

- (1c) Evaluate the potential financial, legal and moral risks associated with each coverage.

Sources:

Group Insurance, Skwire, Chapter 5

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe the pros and cons of a straight discount off billed charges arrangement.

Pros:

- Simple and easy to understand and implement
- Applies to all services billed

Cons:

- No risk shared between insurer and provider
- No incentive to manage utilization
- Billed charges could be increased to offset discount

- (b) Describe the pros and cons of four forms of provider contracting (also referred to as provider cost sharing) other than the current arrangement.

1. Fee schedules and maximums

Pro: simple to implement

Con: provides no incentives to reduce utilization

2. Per diem reimbursements

Pro: Hospital takes on some risk of the plan

Con: provides no incentive to reduce lengths of hospital stay

3. Bonus pools based on utilization

Pro: provides incentive for a provider to control utilization

Con: raises ethical concerns about the potential for providers to withhold medical care to attain bonus levels.

10. Continued

4. Capitation

Pro: virtually all risk passed to provider

Con: raises ethical concerns about withholding medical care (similar to Bonus Pool arrangement)

(c)

- (i) Calculate the change in cost if Louise Inc. switches to the DRG schedule. Show your work.
- (ii) Calculate a per diem rate that would break even with the current provider contracting arrangement. Show your work.
- (iii) Calculate a capitation rate that would save 10% over the current costs. Show your work.

Commentary on Question:

Candidates generally did well on this question. Some of the more common misses were:

- *Not removing the 25% discount from billed charges for Louise, Inc.'s current cost.*
- *Calculating separate per diem rates for each diagnosis. Per diems generally are intended to cover all conditions treated during an inpatient stay.*
- *Calculating capitation on a "per inpatient claim" basis instead of a "per enrolled member" basis, which is what a capitation contract covers.*
- *Failing to specify whether the calculated capitation was on a per month or per year basis (either is fine, however it should be specified).*

(c) (i)

Louise, Inc. Current Billed Amount = \$250,000 + \$750,000 + \$500,000 + \$100,000 = \$1,600,000

Louise, Inc. Current Cost = \$1,600,000 * (1-25%) = \$1,200,000

Louise, Inc. Cost Under DRG Schedule = \$50,000*4 + \$65,000*10 + \$15,000 * 15 + \$15,000 * 15 = \$200,000 + \$650,000 + \$225,000 + \$225,000 = \$1,300,000

Change in Cost = \$1,300,000 - \$1,200,000 = **\$100,000 higher** under the DRG schedule versus a 25% discount from billed.

10. Continued

(c) (ii)

Break-even with current arrangement = \$1,200,000

Total number of Inpatient days = 20 + 15 + 50 + 57 = 142

Overall Per Diem for Break-even = \$1,200,000 / 142 = **\$8,450.70 per IP day**

(c) (iii)

Ten percent savings over current cost = \$1,200,000 * (1-10%) = \$1,080,000

Capitation rate = \$1,080,000 / 12,000 members = \$90.00 Per Member Per Year,

or \$90.00 PMPY / 12 = **\$7.50 Per Member Per Month**

- (d) Recommend a new provider contracting strategy that will incentivize Hospital Moraine to reduce length of stay. Justify your response.

Commentary on Question:

Full credits were given only if justification was provided. No credit was given when definition of provider arrangement was used as justification. Many candidates provided detailed descriptions of potential strategies with little justification on why it is recommended for reducing length of stay.

I recommend using a capitated arrangement with Hospital Moraine to reduce length of stay. Since the hospital's income per patient is fixed under a capitated arrangement, there is no incentive to keep patients longer than necessary, or to over-utilize services during their stay. Efficiency of care is encouraged in order to reduce expenses and maximize profit. XYZ should consider that capitated arrangements, if not designed and implemented appropriately, can incentivize hospitals to withhold care from patients in order to maximize their profits. In order to address this concern, consider implementing quality standards that must be met for Hospital Moraine's contract to remain in force.

11. Learning Objectives:

1. The candidate will understand how to describe plan provisions typically offered under:
 - a. Group and individual medical, dental and pharmacy plans
 - b. Group and individual long-term disability plans
 - c. Group short-term disability plans
 - d. Supplementary plans, like Medicare Supplement
 - e. Group and Individual Long Term Care Insurance

3. Evaluate and recommend an employee benefit strategy.

Learning Outcomes:

- (1c) Evaluate the potential financial, legal and moral risks associated with each coverage.

- (3a) Describe structure of employee benefit plans and products offered and the rationale for offering these structures.

- (3c) Recommend an employee benefit strategy in light of an employer's objectives.

Sources:

The Handbook of Employee Benefits, Rosenbloom, Chapter 32
Group Insurance, Skwire, Chapter 11

Commentary on Question:

This question tested the candidate's knowledge of small group health benefits in the presence of the Affordable Care Act. Candidates were generally able to develop a proper critique of the benefit offerings; however, there were times when a candidate's critique did not identify key elements of the benefit offering (for example, tax treatment of benefits.) The majority of candidates did not perform well on the calculation portion of the question. Many candidates failed to properly project the manual base rate for the expected claim cost.

Solution:

- (a) It is 2014. Since Ms. Moore is only able to offer low starting salaries, she wants to pay 100% of medical premiums for Guthrie Corp employees and their families.

Critique Ms. Moore's proposal.

Commentary on Question:

Candidates generally performed well on this portion of the question. The majority of candidates were able to provide a thorough critique and received full credit.

11. Continued

1. In the current environment, most employees are accustomed to paying some level of contribution toward medical coverage costs.
 2. Contributions motivate employees to take advantage of coverage options elsewhere (both for themselves and for their dependents).
 3. It is much easier to set a precedent from the outset than to add employee contributions at a later date. Changing from a non-contributory to a contributory plan at a later date could create employee anxiety or ill-will.
 4. Employee contributions could help avoid legal problems.
- (b) It is now 2015. Ms. Moore pays 80% of medical premiums for Guthrie Corp employees and their families. She wants to know if Guthrie Corp will qualify for the ACA tax credit when the company files its 2015 taxes.

Describe the requirements for ACA tax credit qualification and determine whether Guthrie Corp meets each requirement for tax year 2015.

Commentary on Question:

The majority of candidates performed well on this question. Candidates were able to provide all the necessary requirements for the tax credit qualification and correctly identify Guthrie Corp's eligibility status.

Guthrie Corp **does not qualify** for a tax credit. It meets only two of the three requirements:

1. Guthrie Corp must have no more than 25 employees. With 24 employees, this qualification is **met**.
 2. Guthrie Corp must have average annual wages of \$50,000 or less per employee. At \$60,000, Guthrie Corp this qualification is **not met**.
 3. Guthrie Corp must pay at least 50% of the insurance premiums. At 80%, this qualification is **met**.
- (c) Critique Ms. Moore's proposal from the point of view of an employee earning \$100,000 annually. Show your work.

Commentary on Question:

The majority of candidates were able to provide a basic critique of the benefit proposal. Very few candidates were able to identify all key elements of the benefit proposal, namely the tax treatment of the benefits for both life and LTD as well as alternate recommendations for benefit offerings where applicable.

Critique/Alternative Recommendation / Conclusion: increase life insurance benefit, reduce LTD percentage of salary

11. Continued

Pros:

Life – provides some coverage (better than no coverage); 50k level means no inputted income to employee

LTD – provides a high level of benefit and benefits paid are tax advantaged

Cons:

Life – 50k replaces less than a year of salary. Most common multiple of earnings plan is one or two times salary, this plan is low.

LTD – The after tax LTD replacement income would be higher on claim than working because benefits would not be taxed. This would incentivize employees to stay on disability rather than come back to work. The situation could be further exacerbated by anti-selection since the LTD coverage is 100% employee paid.

For example: An employee who earns 100,000 a year pays 25% in federal taxes (*candidate does NOT need to know the tax bracket*), his after tax income is 75,000. This employee has a 75% replacement ratio. If an employee receives 90% of his pre-tax salary, or 90,000, he receives a higher salary when drawing disability insurance than when working. This offering provides no incentive to return to work.

Other: Since LTD is optional (employee paid), it is paid with after tax dollars and the benefits are not subject to federal income tax.

- (d) Calculate the actual-to-expected life claims cost ratio for Guthrie Corp for 2016 and 2017 combined. Show your work.

Commentary on Question:

Very few candidates correctly completed all the components of this calculation. Many candidates were able to receive partial credit by identifying key elements of the A/E calculation (for example, trend assumptions and claim cost assumptions). However, many candidates incorrectly identified the manual rate and improperly applied the trend year assumptions and removal of the retention from the manual rate. Many candidates were able to identify the actual claim costs, and received partial credit for the calculation of the A/E ratio.

2%	<= claim and expense trend		\$50,000	<= life insurance benefit			
	Number of Employees	claim cost per \$1,000 covered salary	Available Benefit in Thousands	Expected 2015 CC with retention	Expected 2016 CC with retention	2-year expected CC with retention	2-year expected CC without retention
Females	55	0.63	\$2,750	\$1,732.50	\$ 1,767.15	\$3,499.65	\$2,974.70
Males	45	0.87	\$2,250	\$1,957.50	\$ 1,996.65	\$3,954.15	\$3,361.03
Total	100		\$5,000	\$3,690.00	\$ 3,763.80	\$7,453.80	\$6,335.73
						Actual	\$50,000.00
						Expected	\$6,335.73
						Actual / Expected	789%

12. Learning Objectives:

1. The candidate will understand how to describe plan provisions typically offered under:
 - a. Group and individual medical, dental and pharmacy plans
 - b. Group and individual long-term disability plans
 - c. Group short-term disability plans
 - d. Supplementary plans, like Medicare Supplement
 - e. Group and Individual Long Term Care Insurance

2. The candidate will understand and recommend a manual rate for each of the coverages described in Learning Objective 1.

Learning Outcomes:

- (1b) Describe each of the coverages listed above.
- (2d) Calculate and recommend a manual rate.

Sources:

Group Insurance, Skwire, Daniel D., 7th Edition, Chapters 7 and 23

Study Note: GHC-105-17- Pricing Considerations for Drugs Covered under Pharmacy Benefit programs

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a)
- (i) Describe four pharmacy benchmarks.
 - (ii) Define four key relationships between pharmacy benchmarks.

Commentary on Question:

In order to receive full credit, candidates had to define any benchmark acronyms used and give a brief description. A simple list of acronyms did not receive credit since the question required candidates to “describe” in part (i). For part (ii) concerning benchmark relationships, credit was awarded for directional relationships, such as indicating that a certain benchmark would be greater than or equal to another.

12. Continued

- (i) Pharmacy benchmarks include:
- AMP = Average Manufacturer Price: the price manufacturers sell to wholesalers
 - WAC = Wholesale Acquisition Cost: suggested list price for sale to wholesalers
 - AWP = Average Wholesale Price: WAC plus a markup, regularly published based on available data but not truly an average of prices paid by anyone
 - AAC = Actual Acquisition Cost: the price paid by retailers to wholesalers
 - U&C = Usual and Customary: the price retailers sell to customers
- (ii) Relationships for these benchmarks:
- $WAC = AWP / 1.2$ or $WAC = 0.833 * AWP$
 - $AMP = AAC$ if retailers buy directly from manufacturers
 - $U\&C = AAC + \text{retailer markup}$
 - $U\&C > AWP$
- (b) Calculate the effective member coinsurance for all drugs in 2016 and 2018. Show your work.

Commentary on Question:

Most candidates correctly calculated the member coinsurance for 2016. The most common miss was forgetting to include the dispensing fee. To receive full credit, overall member coinsurance across all tiers of drugs had to be computed since that is what was asked in the question. Some candidates calculated the plan's coinsurance or an overall effective copayment but never converted that to coinsurance as requested.

For 2018, candidates needed to use the distribution of drugs, apply two years of trend, and find the new copay for each grouping of drugs, taking into account the proposed modification to pay the lesser of the copay or the cost of the drug. Several candidates skipped this step and assumed the same copay structure from 2016. Others forgot to trend the cost and utilization in their calculations.

2016 Member Coinsurance Calculation:

12. Continued

Type	Scripts/k	AWP	Discount	Disp Fee	Allowed / Script	Cost share	Mbr Eff Copay	Eff Coins
Generic	4000	\$50	70%	\$2	\$17	\$10	\$10	
Brand	800	\$200	20%	\$2	\$162	\$50	\$50	
Specialty	100	\$3,000	5%	\$2	\$2,852	20%	\$570	
Total	4900	\$134.69			\$98.53		\$27.97	28%
<i>2016 Allowed = 2016 AWP * (1 - Discount) + Disp Fee</i>								

2016 Effective Coinsurance = $\$27.97 / \$98.53 = 28.4\%$

Next, must determine 2018 copays using given distribution of drugs.

Generic				Brand			
% of Scripts	2016 AWP per Script	(a) Allowed/Script	(b) Eff Copay	% of Scripts	2016 AWP per Script	(a) Allowed/Script	(b) Eff Copay
45%	\$7	\$4.45	\$4.45	5%	\$6	\$7.60	\$7.60
25%	\$30	\$12.50	\$10.00	15%	\$35	\$34.66	\$34.66
15%	\$70	\$26.49	\$10.00	25%	\$75	\$71.98	\$50.00
10%	\$150	\$54.49	\$10.00	30%	\$169	\$159.70	\$50.00
5%	\$277	\$98.93	\$10.00	25%	\$500	\$468.56	\$50.00
100%	\$50	\$19.50	\$7.50	100%	\$200	\$188.62	\$45.58
<i>For (a), 2018 Allowed = 2016 AWP * (1 + Ing Cost Trend)^2 * (1 - Discount) + Disp Fee</i>							
<i>For (b), 2018 Effective Copay includes lesser of language.</i>							
<i>Generic 2018 copay = Min (Column A, \$10)</i>							
<i>Brand 2018 copay = Min (Column A, \$50)</i>							

Lastly, using calculations above, 2018 Member Coinsurance Calculation:

Type	Scripts/k	Allowed per Script	Mbr Eff Copay	Eff Coins
Generic	4,162	\$19.50	\$7.50	
Brand	832	\$188.62	\$45.58	
Specialty	104	\$3,326	\$665	
Total	5,098	\$114.59	\$27.14	24%
<i>2018 Scripts/k = 2016 Scripts/k * (1 + Util Trend)^2</i>				

12. Continued

$$2018 \text{ Effective Coinsurance} = \$27.14 / \$114.59 = 23.7\%$$

- (c) Calculate the 2018 premium rates for the South End Chemical prescription drug benefit plan. Show your work.

Commentary on Question:

Very few candidates correctly completed all the components in the calculation of the premium rate. Many neglected to account for the pharmacy rebate. Others incorrectly applied the single and family multipliers to determine the final premium rates. The final step required an assumption of family size, and any assumption was accepted. Partial credit was awarded along the way for correct application of retention or other portions of the calculation, even if the overall answer was incorrect.

From Part B, 2018 total utilization is 5,098 per 1000 and allowed per script is \$114.59.

$$\text{Thus 2018 Allowed PMPM} = 5,098 * \$114.59 / 12,000 = \$48.68$$

From Part B, 2018 member cost share is \$27.14 per script.

$$2018 \text{ member cost share PMPM} = \$27.14 * 5,098 / 12,000 = \$11.53$$

Next, determine pharmacy rebate for brand drugs.

$$2018 \text{ WAC} = 2018 \text{ Brand AWP} / 1.2 \text{ and then Rebate} = 20\% * 2018 \text{ WAC}$$

$$2018 \text{ Rebate} = \$200 (1+8\%)^2 / 1.2 * 20\% = \$38.88 * 832/12000 = \$2.70 \text{ PMPM}$$

$$2018 \text{ Premium PMPM} = (\text{Allowed PMPM} - \text{Rebate PMPM} - \text{Cost Share PMPM}) / (1 - \text{Retention}) = (\$48.68 - \$2.70 - \$11.53) / (1 - 0.15) = \$40.53 \text{ PMPM}$$

Finally, need to determine single and family premium rates based on this overall PMPM. To complete this calculation, assume the average family size is 4.

Tier	Dist	Avg Contract Size	Prem PCPM	Rate Mult	Tiered Rate
Single	25%	1		1	\$62
Family	75%	4		2.5	\$155
Total	100%	3.25	\$131.72	2.125	
$Prem \text{ PCPM} = PMPM * \text{Average Contract Size} = \$40.53 * 3.25 = \$131.72$					
$Single \text{ rate} = \$131.72 / 2.125$					
$Family \text{ rate} = 2.5 * Single \text{ rate}$					

12. Continued

2018 Premium rates are \$62 for single and \$155 for family.

- (d) South End Chemical saw an increase in its 2016 medical claims due to low prescription adherence of diabetic members.

Recommend two different pharmacy plan strategies that could alleviate this problem. Justify your response.

Commentary on Question:

A variety of answers were accepted, as long as they could logically lead to increased adherence. Responses related to step therapy or quantitative limits were not given credit since those strategies would serve to restrict members from accessing drugs. Since the question asked candidates to justify their response, full credit was given when there was a description of each strategy's potential impact on adherence, and not if a candidate simply named a pharmacy benefit program or strategy. It was important that candidates recommended approaches that would impact the pharmacy plan as requested, not changes to the medical benefit.

- Adjust the formulary - Formularies contain lists of preferred drugs. Whether a drug is on the list may affect member costing sharing or access to the drug
- Cost Sharing – Reduce cost sharing to the member for diabetic drugs to encourage prescription adherence for diabetic members. This could be done in different ways, such as \$0 cost sharing for diabetic drugs or implementing Value-Based Insurance Design (VBID)
 - VBID selectively decreases cost sharing on drugs and other medical treatments that are identified as being high value. High value drugs can save overall plan costs in the long run by encouraging medical adherence and avoiding the unnecessary cost of worsening chronic conditions
- Mail Order Programs – Typically provide three-month supply at 2x or 2.5x the monthly cost sharing at a retailer. This provides lower cost to participants, and can increase adherence by reducing the barrier to obtain the drug through mailing it right to the member

13. Learning Objectives:

3. Evaluate and recommend an employee benefit strategy.

Learning Outcomes:

- (3a) Describe structure of employee benefit plans and products offered and the rationale for offering these structures.

Sources:

The Handbook of Employee Benefits, Rosenbloom, Chapter 7
GHC-106-16: Health Plan Payroll Contribution Strategies

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe four key features of CDHPs and explain how they align with the goals of the Chief HR Officer.

Commentary on Question:

Candidates were generally successful in describing key features of CDHPs. Candidates did not receive full credit if they did not explain the alignment with the 2 goals of the Chief HR Officer – controlling unnecessary utilization and encouraging consumerism.

1. CDHPs may feature an individual health account (e.g., HSA) that may be carried over from year to year to pay for health expenses not covered by the plan.
 - a. These accounts promote consumerism by encouraging plan members to budget and save for health care expenses.
2. CDHPs may provide information sources and tools to educate members on health issues or to help members find lower cost or higher quality providers.
 - a. These tools promote consumerism by enabling plan members to compare providers based on price and effectiveness.
3. The plan typically is introduced through a communications program that enhances employee understanding of the plan and encourages consumerism and health behaviors.
 - a. Communications program encourages consumerism and health behaviors.
4. CDHPs may offer access to a health coach or consultant to help plan participants obtain health information, answer questions about health issues, or provide guidance on using providers.
 - a. These services may decrease utilization by providing health advice without requiring an unnecessary office visit.

13. Continued

5. In cases of serious chronic conditions or illnesses, a proactive medical professional may contact plan members to coordinate care among the member and providers.
 - a. These services may decrease utilization, as care coordination can eliminate unnecessary office visits, tests, and diagnostic procedures.
- (b) Calculate the required single and family payroll contributions for the 2019 plan year. Show your work.

Commentary on Question:

Most candidates were successful in applying trends to 2018 premiums. Candidates did not receive full credit if they did not trend payroll contributions, did not combine Hall's and Oates' premiums for 2019, or only calculated the total premium that was needed for 2019 (not just the portion that needed to be charged to employees).

Solution:

Step 1 - Calculate premiums, payroll contributions, and net company cost before plan design and payroll contribution strategy changes.

Comp	Plan	Tier	Enrolled	2018 Premium	2018 Payroll Contrib (EE)	Trend Factor	2019 Premium	2019 Tot Prem	2019 Payroll Contrib (EE)	2019 Net Company Cost
							=2018 Prem * Trend	=2019 Prem * Enrolled	=2018 Contrib * Trend	=(2019 Prem - 2019 Contrib) * Enrolled
Hall	CDHP	EE	1,500	\$850	\$170	1.06	\$901.00	\$1,351,500	\$180.20	\$1,081,200
Hall	CDHP	E+F	6,000	\$1,870	\$374	1.06	\$1,982.20	\$11,893,200	\$396.44	\$9,514,560
Oates	PPO	EE	1,300	\$1,425	\$430	1.06	\$1,510.50	\$1,963,650	\$455.80	\$1,371,110
Oates	PPO	E+F	4,750	\$2,993	\$903	1.06	\$3,172.58	\$15,069,755	\$957.18	\$10,523,150
			13,550					\$30,278,105		\$22,490,020

Step 2 - Calculate targeted 2019 net company costs based on cost savings requirements.

Targeted net company cost = 2019 Net Company Cost (from Step 1) * 95%
 Targeted net company cost = \$22,490,020 * 95% = \$21,365,519

Step 3 - Calculate 2019 total premiums after plan design changes.

Comp	Plan	Tier	Enrolled	2019 Premium (from Step 1)	Change Factor	2019 Premium w/ Change (=Enrolled * 2019 Premium * Change)
Hall	CDHP	EE	1,500	\$901.00	1	\$901.00 \$1,351,500
Hall	CDHP	E+F	6,000	\$1,982.20	1	\$1,982.20 \$11,893,200
Oates	PPO	EE	1,300	\$1,510.50	0.85	\$1,283.93 \$1,669,103
Oates	PPO	E+F	4,750	\$3,172.58	0.85	\$2,696.69 \$12,809,292
			13,550			\$27,723,094

13. Continued

Step 4 - Calculate payroll contributions that achieve targeted costs.

2019 Targeted Cost = 2019 Prem – (EE Enrolled * EE Payroll) + (EE+F Enrolled * 220% * EE Payroll)

Target Cost =	\$21,365,519
Total Prem	\$27,723,094
- EE Enrolled * EE Payroll	(1,500 + 1,300) * EEP = 2,800 EEP
- E+F Enrolled * 220% * EE Payroll	(6,000 + 4,750) * 2.2 * EEP = 23,650 EEP

$$\text{EEP} = (27,723,094 - 21,365,519) / (2,800 + 23,650) \quad \text{\$240.36}$$

$$\text{EFP} = 220\% * \text{EEP} \quad \text{\$528.80}$$

14. Learning Objectives:

2. The candidate will understand and recommend a manual rate for each of the coverages described in Learning Objective 1.

Learning Outcomes:

- (2a) Identify and evaluate sources of data needed pricing, including the quality, appropriateness and limitations of each data source.
- (2g) Apply actuarial standard of practice in evaluating and projecting claim data.

Sources:

ASOP 25, Credibility Procedures
Group Insurance, Skwire, Chapter 22

Commentary on Question:

This question tested the candidate's knowledge of ASOP 25, in addition it required the candidate to evaluate 2 insurance coverages, recognize the differences in claims frequency and severity between the two as it relates to credibility exposure, and make a recommendation for a new credibility standard.

Solution:

Valley Insurance Company is going to launch a new group pharmacy product offered to retirees aged 65 and older

- (a) List criteria to consider when developing a credibility standard and characteristics you should consider when selecting relevant experience.

Commentary on Question:

Candidates who were familiar with ASOP 25 did well on this question.

Considerations

- Does the procedure produce reasonable results?
- Is the procedure appropriate for the intended purpose?
- Is the procedure practical to implement
- Does the procedure satisfy applicable laws?

Characteristics

- Homogeneity
- Demographics
- Coverages
- Frequency
- Severity
- Other risk characteristics the actuary expects to be similar to the subject material

14. Continued

- (b) Recommend a credibility threshold (N) for this new product. Justify your response.

Commentary on Question:

This question required the candidate to recognize that transplant claims are low frequency, high severity; and that pharmacy claims are very high frequency with much less stable average cost. Hence the candidate should recommend lower exposure for the pharmacy coverage than required for transplant coverage. $N < 10,000$.

I would recommend $N=1,500$. This is the threshold CMS uses for Part D coverage. In addition Rx claims have a much higher frequency (especially for retirees) and less variability in their severity than transplant claims. For insurance product that covers population age 65+, the underlying demographics are more homogeneous.