

# GH VRU Model Solutions

## Fall 2023

### 1. Learning Objectives:

1. The candidate will understand and apply valuation principles for group and health insurance contracts.

### Learning Outcomes:

- (1a) Describe the types of claim reserves (e.g., due and unpaid, ICOS, IBNR, LAE, PVANYD).
- (1b) Explain the limitations and biases of the traditional valuation methods.
- (1c) Calculate appropriate claim reserves given data.
- (1e) Evaluate data resources and appropriateness for calculating reserves.

### Sources:

Group Insurance Ch 39, GHFV-103-16 Health Reserves

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

- (a)
  - (i) Describe the Tabular method, Examiner's method, and Factor method.
  - (ii) Explain for which lines of business it is appropriate to use each method.

### Commentary on Question:

*Most candidates were able to describe the three methods, but had difficulty in part ii) of identifying appropriate lines of business for the examiner's method and factor method.*

- (i)

#### **Tabular method –**

Under this method, a reserve is computed for each claim (rather than for the block as a whole), using a table of expected recovery and mortality rates. The actuary projects future benefits expected to be paid to the claimant, and then determines the present value of those benefits, discounting for recovery and mortality (using the tabular rates) as well as for interest.

## 1. Continued

### **Examiner's method –**

Under this method, claim department or other qualified personnel are asked to estimate the remaining claim payments expected on known claims, based on the characteristics of each claim.

### **Factor method –**

This method is generally used for reserves that are easily estimated due to a short lag or run off period. Utilizes historical factor (percent of premium, claims PMPM factor etc.) to project future ultimate claims.

(ii)

**Tabular method –** This method is used for long term products such as long term disability and long term care.

### **Examiner's method –**

This method can be used for the following types of products:

Short Term Medical Products

- to estimate very large catastrophic claims.

Short Term Disability and Hospital Income

- where the present value of amounts not yet due is easily estimated and not particularly impacted by termination rates or other contingencies.

### **Factor method –**

This method is used for Group Life and Medical Products.

- (b) Recommend whether the development method is appropriate for each scenario. Justify your answer.

### **Commentary on Question:**

*Most candidates received partial credit on this section.*

*Table 4 presented a challenge to many candidates as they looked only at the lag patterns and not the claims volume that was changing significantly. Some candidates did not provide a recommendation, but instead gave pros and cons. If no recommendation was given, then no points were awarded for that scenario.*

### Table 1

- No, the development method is not appropriate.

The lag patterns are not consistent in the progression of claims from incurred date to ultimate date. The claim pattern is too erratic to use the development method.

### Table 2

- Yes, the development method is appropriate.

The lag patterns appear to be consistent with smaller amounts of paid claims in later lag periods. The duration appears to be within a 1-year timespan which is considered a shorter duration. Claim levels indicate that this is a large enough block of business to deem credible.

# 1. Continued

## Table 3

- No, the development method is not appropriate.

It is not clear when the ultimate date will be or what the ultimate claims amount will be in order to calculate the completion factors to be used in the development method

## Table 4

- No, the development method is not appropriate.

While lag patterns appear consistent, the problem is the block appears to be either growing rapidly or has issues with credibility. It is unclear if the current payment pattern will hold in later months with higher claim volume.

- (c) Recommend the incurred month to be used as the basis for an age-to-ultimate development factor reserve. Show your work and justify your answer.

### **Commentary on Question:**

*Most candidates did well on this section. Below is a solution, but other selected months with appropriate justification that met the Chief actuary's criteria are acceptable.*

January has an unusual payment in month 12 that does not seem to be representative of the other months.

The chief actuary requires at least 10 months to be used, which eliminates using May through December.

Recommend using Feb as it has the most months of data otherwise.

- (d) Calculate the IBNR as of January 31, 20X2 using your recommendation from (c). Show your work.

### **Commentary on Question:**

*The solution in the attached excel file is based on having chosen February as the reserve month. Other solutions are acceptable based on the month recommended in part c. See excel file.*

- (e) Calculate the total case reserve for the members in Exhibit 3. Show your work.

### **Commentary on Question:**

*Since the contract terms for Hospital C and D are based on an average cost per day, the length of stay for members at those hospitals needs to be calculated in the actual number of days. Some candidates used 30 days for all months instead of the calendar days that each month has. Also, if the length of stay below plus 1 was used, then this was an acceptable answer. Many candidates did not apply the stop loss correctly for member 4 to limit the financial limit to \$300,000 across both hospital stays.*

# 1. Continued

		A)	B)	C) = 12/31- B)	D) = Hosp A and B	E) = Hosp C and D	F) = A)*D) + C)*E)	G) = Min \$300k, F) per member
Mbr ID	Hosp	Billed Amt	Admit Date in 20X2	LOS	Discount	Cost per day	Expected Claims	With Financial Limit Applied
1	A	\$944,647	9/1		0.6		\$566,788.20	\$300,000.00
2	B	\$928,492	9/1		0.4		\$371,396.80	\$300,000.00
3	C	\$505,729	11/1	60		4000	\$240,000.00	\$240,000.00
4*	B	\$501,205	9/1		0.4		\$200,482.00	\$200,482.00
4*	D	\$849,032	11/1	60		2500	\$150,000.00	\$99,518.00
5	A	\$747,554	9/1		0.6		\$448,532.40	\$300,000.00
6	B	\$948,928	9/1		0.4		\$379,571.20	\$300,000.00
7	C	\$524,505	10/1	91		4000	\$364,000.00	\$300,000.00
8	D	\$819,454	10/1	91		2500	\$227,500.00	\$227,500.00
9	C	\$530,468	10/1	91		4000	\$364,000.00	\$300,000.00
10	D	\$943,329	9/1	121		2500	\$302,500.00	\$300,000.00
11	A	\$696,121	11/1		0.6		\$417,672.60	\$300,000.00
12	B	\$816,868	9/1		0.4		\$326,747.20	\$300,000.00
13	C	\$946,993	9/1	121		4000	\$484,000.00	\$300,000.00
14	D	\$658,236	10/1	91		2500	\$227,500.00	\$227,500.00
15	A	\$850,079	11/1		0.6		\$510,047.40	\$300,000.00
16	B	\$868,005	9/1		0.4		\$347,202.00	\$300,000.00
17	C	\$845,355	9/1	121		4000	\$484,000.00	\$300,000.00
18	D	\$639,030	10/1	91		2500	\$227,500.00	\$227,500.00
19	C	\$557,874	9/1	121		4000	\$484,000.00	\$300,000.00
20	D	\$550,065	10/1	91		2500	\$227,500.00	\$227,500.00
							<b>Total =</b>	<b>\$5,650,000</b>

Mbr 4 has 2 hospital stays so the second visit is capped at \$300K - \$200,482 = \$99,518.00

## 2. Learning Objectives:

1. The candidate will understand and apply valuation principles for insurance contracts.

### Learning Outcomes:

- (1e) Evaluate data resources and appropriateness for calculating reserves.
- (1f) Describe, calculate and evaluate non-claim reserves and explain when each is required.
- (1g) Apply applicable standards of practice related to reserving.

### Sources:

GHVR-103-16 Health Reserves

ASOP 42 (3)

### Commentary on Question:

*See commentary on specific sections below.*

### Solution:

- (a) Identify and describe any provider or outcome-based liabilities that should be accounted for on the Non-Grandfathered Small Group Fully Insured block.

#### Commentary on Question:

*Most candidates were able to describe either one of the ACA-related liabilities.*

*Nearly all candidates did not identify that no provider-related liabilities were needed. Some candidates identified group-specific liabilities, but these are not relevant in Non-Grandfathered Small Group space.*

- There are no outcome or provider based liabilities needed in a discounted FFS Model, as there are no incentive or bonus payments contracted to providers
- MLR - The actuary should consider accruing a liability if the MLR is lower than the MLR Threshold for rebates.
- Risk Adjustment - the actuary should consider accruing payments or receipts from HHS risk adjustment.

- (b) Identify and describe considerations when setting the liabilities in part (a).

#### Commentary on Question:

*Most candidates were able to describe some considerations related to the ACA liabilities.*

## 2. Continued

- MLR - Make sure to adjust claims by gross reinsurance, risk adjustment recoveries, IBNR, and allowable quality improvement expenses. Make sure to adjust revenue by taxes
  - MLR - Collectability and required adjustments
  - Risk Adjustment - The actuary must estimate the MCO's average risk score against the statewide average, knowing that this is a zero-sum game
  - Risk Adjustment - Understand whether payments are market neutral and the collectability
  - Risk Adjustment - Understand the payments methodology prescribed by law
  - Risk Adjustment - the outcome of a RADV audit
- (c) Calculate the withhold and incentive liabilities for each provider group. Justify your answer and show your work.

### Commentary on Question:

*Most candidates were able to calculate the inpatient incentive correctly.*

*Most candidates were not able to calculate the physician incentive correctly. Common mistakes were: calculating the withhold as a percentage of the target PMPM, allocating the whole withhold given a positive balance, or not offsetting a positive physician balance by inpatient losses. Partial credit was given if any of these occurred.*

*Candidates also failed to properly justify their work given their mathematical responses.*

Inpatient Incentive:

Provider	Inpatient (Block-Wide)			
	Claims	Target	Balance	Liability
Provider Group A	\$2,000,000	\$2,000,000	\$0	<b>\$0</b>
Provider Group B	\$1,100,000	\$1,000,000	-\$100,000	<b>\$0</b>
Provider Group C	\$450,000	\$500,000	\$50,000	<b>\$20,000</b>
Provider Group D	\$2,000,000	\$2,500,000	\$500,000	<b>\$200,000</b>

Claims = Claim PMPM \* Member Months

Target = Target PMPM (\$100) \* Member Months

Balance = Claims – Target

Liability = Maximum of (Balance \* Bonus Percentage (40%)) and 0.

Providers A and B do not book an Inpatient Incentive liability since their balance is either 0 or a negative amount.

## 2. Continued

Providers C and D do have positive liabilities since their balances are positive.

Physician Withhold:

Provider	Physician (Block-Wide)						Liability
	Total Claims	Withhold	Adjusted Claims	Target Claims	Balance	IP Losses (If Any)	
Provider Group A	\$1,100,000	\$110,000	\$990,000	\$1,000,000	\$10,000	\$0	<b>\$10,000</b>
Provider Group B	\$450,000	\$45,000	\$405,000	\$500,000	\$95,000	-\$100,000	<b>\$0</b>
Provider Group C	\$300,000	\$30,000	\$270,000	\$250,000	-\$20,000	\$0	<b>\$0</b>
Provider Group D	\$1,250,000	\$125,000	\$1,125,000	\$1,250,000	\$125,000	\$0	<b>\$125,000</b>

Total Claims = Actual Claim PMPM \* Member Months

Withhold = Total Claims \* Withhold Percentage (10%)

Adjusted Claims = Total Claims – Withhold

Target Claims = Target Claim PMPM \* Member Months

Balance = Target Claims – Adjusted Claims

Liability = Maximum of (Balance + Inpatient Loss (If Any)) and 0.

Providers A and D will book a physician withhold liability since they do not have any IP losses and they have positive Physician balances.

Provider B has positive physician balance but is completely offset by the IP balance.

Provider C has a negative physician balance and no liability is booked.

- (d) Describe considerations when accounting for physician withholding.

### Commentary on Question:

*Candidates struggled to identify specific considerations related to physician withhold liabilities. Responses containing information from ASOP 42 were commonly used but not specifically relevant to physician withholding.*

- Monthly accounting is needed to keep track of complex reimbursement arrangements to estimate liabilities. This matches fully incurred costs against revenue.
- Since the maximum payment is the withhold, the MCO could book the withhold amount as a reserve until more experience develops. This is particularly true in the early months of a contract before experience develops.
- Adjustments for data errors, reduce claims for internal stop loss arrangements, and to account for fully incurred claims.
- Disputes over incurred claims estimates are typically minimized by paying claims run-out for a period after the contract date.

## 2. Continued

- (e) Describe considerations when estimating provider-related assets and liabilities.

**Commentary on Question:**

*A majority of candidates were able to describe some considerations from ASOP 42.*

- **Provider Risk-Sharing and Capitation Arrangements** - The actuary should consider the relevant contractual arrangements with providers to determine whether the contractual arrangements require an asset or liability to be estimated.
- **Provider Financial Condition** - When a risk-bearing entity shares risk with a provider under a risk-sharing or capitation arrangement, the actuary should estimate, to the extent practical, whether the provider's overall financial condition will allow it to meet its obligations, and, if not, adjust the asset or liability accordingly.
- **Provider Incentive or Penalty Payments** - If a provider agreement calls for incentive or penalty payments if certain conditions are met, such as quality of care standards or claim targets, the actuary should consider whether the risk-bearing entity should record a provider-related asset or liability.
- **Provider Risk-Bearing Entities** - When the risk-bearing entity is a provider, the actuary should also consider relevant contractual arrangements with other providers as well as non-provider entities to determine whether the contractual arrangements require an asset or a liability to be estimated.

- (f) Describe Claim Stabilization Reserves (CSR), including their advantages to employer groups.

**Commentary on Question:**

*A majority of candidates were able to describe CSRs, including employer advantages.*

- These are contracts designed to minimize risk charges to employers by sharing the risk of emerging claims cost experience.
- Favorable claims experience under the contract creates surplus that is retained for the benefit of the employer as a partial offset to future losses or to reduce future rate increases.
- These amounts may be paid out to the employer in the form of rate credits.
- Employer groups are entitled to the entire CSR if the account terminates after all claims run-out has been paid.

- (g) Calculate the maximum experience refund for each of the four large group customers. Justify your answer and show your work.



## 2. Continued

### Commentary on Question:

*Most candidates were able to set up the calculation and its individual components well. Common mistakes were to not compare the ending balance against the minimum CSR and omitting the risk charges and interest from the balance calculation.*

*Candidates also failed to properly justify their work given their mathematical responses.*

		Group A	Group B	Group C	Group D
	Prior CSR	\$5,000	\$25,000	\$10,000	\$75,000
+	Interest	\$250	\$1,250	\$500	\$3,750
+	Premium	\$100,000	\$200,000	\$210,000	\$350,000
-	Claims	\$110,000	\$190,000	\$215,000	\$404,250
-	Risk Charge	\$2,000	\$4,000	\$4,200	\$7,000
=	<b>Balance</b>	<b>-\$6,750</b>	<b>\$32,250</b>	<b>\$1,300</b>	<b>\$17,500</b>
	Minimum CSR	\$5,000	\$10,000	\$10,500	\$17,500
	<b>Refund</b>	<b>\$0</b>	<b>\$22,250</b>	<b>\$0</b>	<b>\$0</b>

Interest = Prior CSR \* Interest Percentage (5%)

Risk Charge = Premium \* Risk Charge Percentage (2%)

Balance = Prior CSR + Interest + Premium – Claims – Risk Charge

Minimum CSR = Premium \* Minimum CSR Percentage (5%)

Refund = Maximum of (Balance – Minimum CSR) and 0

Group A has a negative balance and thus no CSR refund is given. Group A does not have to retroactively fund a minimum CSR.

Group B has a positive balance that is greater than the minimum CSR, and thus receives a CSR refund of the difference.

Group C has a positive balance that is less than the minimum CSR, and thus no CSR refund is given.

Group D has a positive balance that is equal to the minimum CSR, thus no CSR refund is given.

### 3. Learning Objectives:

1. The candidate will understand and apply valuation principles for insurance contracts.

#### Sources:

Individual Insurance, Ch. 6

#### Commentary on Question:

*Commentary listed underneath question component.*

#### Solution:

- (a) List and describe three key types of premium reserves.

#### Commentary on Question:

*This one was answered very well. Most candidates received full score.*

- Gross unearned premium reserve (UPR) – Reserve that sets aside the part of premium that has been received for coverage which has not yet occurred as of the valuation date.
- Premium paid in advance – Reserve held for premiums paid before the effective/renewal date of the policy.
- Premium due and unpaid – Asset to account for late premium payments

- (b) Calculate the four missing (?) cells. Justify your answers.

#### Commentary on Question:

*This one was answered well. One common mistake is about the UPR for the policy #001 with a single premium mode. The content can be found on page 217 of Individual Insurance, Ch. 6.*

Policy 001: No UPR is needed for single premium insurance per NAIC model regulations

Policy 002: \$1,100 – Annual mode premium evaluated at the midpoint.

Policy 003: 9/1/20X1 – Quarterly premium mode with GUPR showing 1/3 of the premium has yet to be earned.

Policy 004: 11/1/20X0 – Annual premium with GUPR being showing 2/3 of the premium has yet to be earned.

- (c) Calculate the eight missing (?) cells. Justify your answers.

### 3. Continued

**Commentary on Question:**

*This one was not answered well in general. Many seemed to struggle with the application of premium reserve types as it relates to understanding the timing of premium cash flows relative to a given valuation date. Additionally, typical health insurance contracts do not allow for partial refund of monthly premium. Any premium due and collected as of the first of a given month is fully recognized as 1 month of earned premium.*

Policy #005 – Premium Asset: \$5,000

Policy #005 – Type: Premium paid in advance

Policy #006 – Premium Received: \$500

Policy #006 – Type: Premium due and unpaid

Policy #007 – Valuation Date: 10/1/20X1 -- one quarter from the policy effective date, since quarterly premium due is \$3,000 and there is a premium reserve of \$3,000 (presumably for Q3 20X1) being held

Policy #007 – Type: Premium due and unpaid

Policy #008 – Reserve: \$0

Policy #008 – Type: No Reserve Needed - Premium paid on due date

- (d) Assess the accuracy of the following statements by identifying which are true or false. Justify your answer.
- (i) An insurer can calculate its profits and losses by subtracting paid claims and paid administrative expenses from premium received.
  - (ii) Liabilities are for obligations which have not yet been incurred or not yet accrued.
  - (iii) Reserves are for obligations that are already incurred and accrued.
  - (iv) The goal of statutory statements is to match profit streams with revenue streams with some conservatism.
  - (v) Mid-terminal reserves are the average of the reserves held on the first and last days of the year.

### 3. Continued

- (vi) For premium due and unpaid, all unpaid premium can be booked as an asset according to statutory accounting.

**Commentary on Question:**

*This one was answered very well for the first 4 statements, but not for the last two. Only few candidates understand the correct definitions of mean reserves and mid-reserves. The content is in the footnote on page 218 of Individual Insurance, Ch. 6. A few candidates understand statutory due and unpaid correctly.*

- (i) FALSE – reserves must be factored in to ensure that the insurer is not taking credit (in its profit & loss calculations) for money received that will be needed later to cover expenses which in some way are connected with that money
- (ii) FALSE - Liabilities are for obligations that are already incurred and accrued.
- (iii) FALSE - Reserves are for obligations which have not yet been incurred or not yet accrued
- (iv) FALSE - This describes GAAP statements. SAP is focused on solvency and tend to be the most conservative.
- (v) FALSE - Mean reserves is the average reserve on the first and last days of the year whereas Mid-Terminal Reserves is the average of the terminal reserve at the end of the current year and the preceding year.
- (vi) FALSE - this is limited to the smaller of 90 days past due or one modal premium. In any case, the actuary may further limit to what is expected to be paid.

#### 4. Learning Objectives:

1. The candidate will understand and apply valuation principles for insurance contracts.

#### Learning Outcomes:

- (1f) Describe, calculate and evaluate non-claim reserves and explain when each is required.

#### Sources:

Bluhm, Chapter 6

#### Commentary on Question:

*Part A was a straight calculation question where the candidate had to apply the prospective reserve formula and the retrospective reserve formula in order to solve for the unknowns. Candidate performance varied widely on part A with several candidates solving the entire question while many other candidates were unable to develop an answer to any component. Common candidate problems included not placing timeline correctly (premiums paid at beginning of year, claims paid in middle of year, lapses occurring at end of year) and not applying retrospective reserve formula to solve for D and E.*

*Part B requested a calculation of the year 3 reserve using a two-year full preliminary term method. In this case all information necessary to calculate the reserve was in the original data. Candidates performed poorly on this part with the majority of the candidates not scoring any points. Many candidates identified that under the 2YFPT method, reserves for time 1 and time 2 would be zero but failed to recognize the need to recalculate a net premium using data for just years 3 forward.*

*Several candidates indicated they ran out of time to complete the answer. It was unclear whether this was the time they allocated for this question or whether they put this question off until the end of the exam and this was time for the total exam.*

#### Solution:

- (a) Solve for A by using prospective formula (reserve=PV Benefits-PV Net Premium) and reserve at 12/31/20X4:

$$141,094.55=7250*100*1.05^{-.5}-100A$$

$$A=5664.33$$

Solve for B by using prospective formula:

$$B=(7250*100*1.05^{-1.5}+6840*300*1.05^{-.5})-5664.33*(100/1.05+300)$$

$$B=434,696$$

Solve for C by using prospective formula

$$C=(7250*100*1.05^{-2.5}+6840*300*1.05^{-1.5}+6430*700*1.05^{-.5})-5664.33*(100/1.05^2+300/1.05+700)$$

$$C=841,491,40$$

#### 4. Continued

Solve for D by using retrospective formula (reserve=AV premiums-AV Benefits) and reserve at 12/31/20X1

$$824,071.11=5664.33*1000*1.05-D*1000*1.05^{.5}$$

$$D=5000$$

Solve for E by using retrospective formula and reserve at 12/31/20X2

$$841,491.40=824,071.11*1.05+5664.33*E*1.05-5830*E*1.05^{.5}$$

$$E=900$$

- (b) The reserve at 12/31/20X3 can be calculated using the retrospective formula (accumulated premiums less accumulated claims). First you must calculate the level premium under 2YFPT (PV Claims for years 3+ divided by PV exposures for years 3+).

$$\text{PV Claims}=7250*100*1.05^{-2.5}+6840*300*1.05^{-1.5}+6430*700*1.05^{-.5}=6,938,673.86$$

$$\text{PV Exposures}=100/1.05^2+300/1.05+700=1076.42$$

$$\text{Level Premium}=6,938,673.86/1076.42=6,446.08$$

$$\begin{aligned}\text{Reserve at 12/31/20X3}&=700*6446.08*1.05-700*6430*1.05^{.5} \\ &=125,718.80\end{aligned}$$

## 5. Learning Objectives:

4. The candidate will understand how to evaluate retiree group and life benefits in the United States.

### Sources:

GHVR-816-16: US Employers' Accounting of Postretirement Benefits  
Other Than Pensions Study Note

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

Calculate the following for an employee, hired at age 35, and currently age 45. Show your work.

- (i) EPBO
- (ii) APBO
- (iii) Service Cost
- (iv) Interest Cost

### Commentary on Question:

*Some candidates did not recognize that the benefit amount needs to be multiplied by the number of years of service beyond age 40. Another common issue was that termination stopped at age 60 that was commonly missed.*

## 5. Continued

(i) EPBO

Curr Age	45	0			1.00000	1.00000	
	46	1			0.96000	0.95694	
	47	2			0.92160	0.91573	
	48	3			0.88474	0.87630	
	49	4			0.84935	0.83856	
	50	5			0.81537	0.80245	
	51	6			0.78276	0.76790	
	52	7			0.75145	0.73483	
	53	8			0.72139	0.70319	
	54	9			0.69253	0.67290	
	55	10			0.66483	0.64393	
	56	11			0.63824	0.61620	
	57	12			0.61271	0.58966	
	58	13			0.58820	0.56427	
	59	14			0.56467	0.53997	
Full Elig	60	15			0.56467	0.51672	
	61	16			0.56467	0.49447	
50% ret	62	17	0.5	\$5,000	0.56467	0.47318	\$668
	63	18	0.5	\$5,000	0.56467	0.45280	\$639
	64	19	0.5	\$5,000	0.56467	0.43330	\$612
100% ret	65	20	1.0	\$5,000	0.56467	0.41464	\$1,171
	66	21	1.0	\$5,000	0.56467	0.39679	\$1,120
	67	22	1.0	\$5,000	0.56467	0.37970	\$1,072
	68	23	1.0	\$5,000	0.56467	0.36335	\$1,026
	69	24	1.0	\$5,000	0.56467	0.34770	\$982
	70	25	1.0	\$5,000	0.56467	0.33273	\$939
	71	26	1.0	\$5,000	0.56467	0.31840	\$899
	72	27	1.0	\$5,000	0.56467	0.30469	\$860
	73	28	1.0	\$5,000	0.56467	0.29157	\$823
	74	29	1.0	\$5,000	0.56467	0.27902	\$788
Last paya	75	30	1.0	\$5,000	0.56467	0.26700	\$754
							\$12,353

(ii)  $APBO = EPBO \times \text{attribution factor} = \$12,353 \times 0.25 = \$3,088$

(iii)  $\text{Service Cost} = EPBO / \text{years of post-40 service} = \$12,353 / 20 = \$618$

(iv)  $\text{Interest Cost} = \text{discount rate} \times (\text{APBO} + \text{service cost})$   
 $= 0.045 \times (\$3,088 + \$618) = \$167$



## 6. Learning Objectives:

2. The candidate will understand how to prepare and be able to interpret insurance company financial statements in accordance with U.S. statutory principles and GAAP.

### Learning Outcomes:

- (2a) Prepare financial statement entries in accordance with generally accepted accounting principles.
- (2c) Project financial outcomes and recommend a strategy.

### Sources:

Group Insurance, Skwire, Daniel D., 8th Edition, 2021, Ch. 43: Analysis of Financial and Operational Performance

GHVR-109-19: Health Insurance Accounting Basics for Actuaries

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

- (a) Contrast GAAP financial statements and statutory financial statements

### Commentary on Question:

*Candidates generally scored well on this section.*

*A wide range of answers were accepted, some of which are listed in the model solution. Four distinct contrasts were required for full credit.*

GAAP financial statements are produced by “registrants” who release equity and debt instruments, and regulated by the SEC. Statutory (STAT) financial statements are produced by licensed insurance entities and are regulated by the state insurance departments.

GAAP financial statements are produced on a consolidated (whole firm) basis with some breakouts into reportable segments, while STAT statements are produced “standalone” by each licensed entity.

GAAP financial statements are not pre-formatted and registrants have some flexibility with respect to nomenclature, segmentation, and other aspects. STAT statements are rigid and pre-formatted.

GAAP financial statements are much less detailed than STAT.

STAT statements include the requirement that a qualified actuary opines on the liabilities, while there is no analogous requirement for GAAP.

## 6. Continued

- (b) List primary users of each type of financial statement.

**Commentary on Question:**

*Candidates generally scored well on this section.*

*Two distinct users per financial statement type were required for full credit and credit was given for accurate responses other than those listed below.*

GAAP: shareholders, company management

STAT: regulators, state departments of insurance

- (c) Calculate the following financial metrics for each company. Show your work.

- (i) Return on Equity
- (ii) Total Leverage Ratio
- (iii) Return on Assets
- (iv) Net Profit Margin
- (v) Total Asset Turnover

**Commentary on Question:**

*Candidates generally scored well on this section. Partial credit was provided when the appropriate process was followed and minor mistakes were carried through. The most common mistakes were omitting the taxes from the net income calculation, miscalculating shareholder equity, and miscalculating total assets.*

## 6. Continued

	Company A	Company B	Company C	
<u>Income Statement</u>				<u>Formulas:</u>
Premium Revenue	400,000,000	240,000,000	15,000,000	
Operating Expenses	375,000,000	224,000,000	13,000,000	
Non-Operating Expenses	2,500,000	2,500,000	800,000	
Pre-tax Income	22,500,000	13,500,000	1,200,000	Revenue - Operating Expenses - Non-Operating Expense
taxes	4,500,000	2,700,000	240,000	.2 * Pre-Tax Income
Net Income	18,000,000	10,800,000	960,000	Pre-Tax Income - Taxes
<u>Balance Sheet</u>				
Total Current Assets	150,000,000	80,000,000	35,000,000	
Total Fixed Assets	50,000,000	20,000,000	15,000,000	
Total Assets	200,000,000	100,000,000	50,000,000	
Total Current Liabilities	50,000,000	50,000,000	5,000,000	
Long-term Debt	25,000,000	2,000,000	1,000,000	
Equity	125,000,000	48,000,000	44,000,000	Total Assets - Total Current Liabilities - Long-term Debt
i) Return on Equity	14.40%	22.50%	2.18%	Net Income / Shareholder Equity
ii) Total Leverage Ratio	1.60	2.08	1.14	Total Assets / Shareholder Equity
iii) Return on Assets	9.00%	10.80%	1.92%	Net Income / Total Assets
iv) Net Profit Margin	4.50%	4.50%	6.40%	Net Income / Revenue
v) Total Asset Turnover	2.00	2.40	0.30	Revenue / Total Assets

- (d) Calculate the increase in revenue required for each company to maintain the same return on equity as the current year. Show your work.

### Commentary on Question:

Many candidates attempted this question but neglected to increase the total assets and equity by the current period's net income. Partial credit was provided when the appropriate process was followed and minor mistakes were carried through. Many successful candidates used the Goal Seek Excel function to target the previous year's ROE by manipulating the current year's revenue.

	Company A	Company B	Company C	
<u>Income Statement</u>				<u>Formulas:</u>
Revenue	433,860,000	261,912,000	16,110,000	Revenue required to target ROE from previous year
Operating Expenses	405,000,000	241,920,000	14,040,000	Given in problem
Non-Operating Expenses	2,575,000	2,575,000	824,000	Given in problem
Pre-tax Income	26,285,000	17,417,000	1,246,000	Revenue - Operating Expenses - Non-Operating Expense
taxes	5,257,000	3,483,400	249,200	.2 * Pre-Tax Income
Net Income	21,028,000	13,933,600	996,800	Pre-Tax Income - Taxes
<u>Balance Sheet</u>				
Total assets	221,028,000	113,933,600	50,996,800	Increase Assets by Net Income
Total Current Liabilities	50,000,000	50,000,000	5,000,000	
Long-term Debt	25,000,000	2,000,000	1,000,000	
Equity	146,028,000	61,933,600	44,996,800	Total Assets - Total Current Liabilities - Long-term Debt
Return on Equity	14.40%	22.50%	2.22%	Target ROE from previous year
Required revenue Increase (\$)	33,860,000	21,912,000	1,110,000	
Required revenue Increase (%)	8.47%	9.13%	7.40%	

## 6. Continued

- (e) Explain why the required revenue increase varies by company.

**Commentary on Question:**

*No credit was given when candidates mentioned the size of the company without further elaboration. Most candidates were not specific enough in their response.*

Each company's percent increase of revenues is different because each company has a different total leverage ratio (TLR). The ROE consists of both the return on assets and the total leverage ratio. The impact of additional net income (achieved through premium increases) on the ROA is magnified by a company's TLR. The higher the TLR, the more of an impact an increase in Net Income will have on a company's Return on Equity.

- (f) Describe the differences in accounting for fully-insured and ASO contracts.

**Commentary on Question:**

*Candidates generally performed poorly on this section. Candidates provided a lot of detail of ASO and fully-insured contracts but not necessarily the differences in the accounting. Four distinct contrasts were required for full credit.*

- In ASO contracts, the insurer only adjudicates claims and provides access to discounts, but does not retain risk like in fully insured contracts.
- Correct accounting treatment is to not reflect ASO benefit payments on income statement (since payments are just a pass through), just on balance sheet
- With this treatment, insurer would record no claim liabilities or claims reserves with ASO business
- More complicated ASO arrangements (related to risk sharing and termination of contract) may require actuarial involvement
- Under SAP, ASO fees are recognized as contra-expense, and not revenue
- ASO providers do not require as much assets compared to insured plans, and thus have lower asset turnover

- (g) Calculate the following projected financial metrics for Company C. Show your work.

- (i) Return on Equity
- (ii) Total Leverage Ratio
- (iii) Return on Assets

## 6. Continued

- (iv) Net Profit Margin
- (v) Total Asset Turnover

### Commentary on Question:

*Most candidates knew how to approach this problem. The most common mistakes were updating equity without making an equivalent update to the total assets, and not properly adjusting the net income for the addition of the ASO.*

	Company C	New ASO	New Total
<b>Income Statement</b>			
Revenue	15,110,000	5,000,000	21,110,000
Operating Expenses	14,040,000		
Non-Operating Expenses	824,000		
Pre-tax Income	1,246,000		
taxes	249,200		
Net Income	996,800	300,000	1,296,800
<b>Balance Sheet</b>			
Total assets	50,996,800	4,500,000	55,496,800
Total Current Liabilities	5,000,000		5,000,000
Long-term Debt	1,000,000		1,000,000
Equity	44,996,800	4,500,000	49,496,800
Return on Equity	2.22%	6.67%	2.62%
Total Leverage Ratio	1.13	1.00	1.12
Return on Assets	1.95%	6.67%	2.34%
Net Profit Margin	6.19%	6.00%	6.14%
Total Asset Turnover	0.32	1.11	0.38

- (h) Explain how the financial metrics in part (g) would change if Company C financed the expansion with debt instead of equity.

### Commentary on Question:

*Most candidates performed well on this question. Many candidates neglected to mention ROA, net profit margin and total asset turnover were unchanged.*

- Return on Equity is higher, because no additional equity issued.
- Leverage Ratio is higher, because debt has increased
- Return on Assets, Net Profit Margin, and Total Asset Turnover all unchanged, because total assets have not changed

## 7. Learning Objectives:

3. The candidate will understand how to evaluate the impact of regulation and taxation on companies and plan sponsors in the US.

### Learning Outcomes:

- (3a) Describe the regulatory and policy making process in the US.
- (3b) Describe the major applicable laws and regulations and evaluate their impact.

### Sources:

<https://www.theactuarymagazine.org/pharmaceutical-patent-regulation-in-the-united-states/>

<https://www.theactuarymagazine.org/potential-abuses-within-u-s-pharmaceutical-patent-regulation>

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

- (a) Explain the strategies a patent-holder may employ to extend the lifespan of a patent.

### Commentary on Question:

*Candidates performed well on this question. For the most part, they were able to explain the strategies and what they entailed. Some candidates were able to list the strategy but unable to explain what it was trying to achieve.*

- **Evergreening:** Filing Secondary patents for any of the patentable aspects of a drug in order to extend the length of the exclusivity period for longer than 20 years
- **Product Hopping:** reformulations of a drug to both extend exclusivity and prevent Abbreviated New Drug Application (ANDA) applicants from referencing the primary patent.
- **Withholding Samples:** manufacturer withholding samples from a potential generic distributor, inhibiting its ability to perform a bioequivalence assessment.
- **Patent Thicket:** uses the presence of multiple patents on a drug to deter potential litigants. Generic entrant burdened to prove that every patent covering the drug is invalid.

## 7. Continued

- **Pay for Delay:** Settlements are common when legal action is brought through the Hatch-Waxman Act, inter parties review (IPR) or other legal action entirely. The terms of these settlement agreements are not often publicly available. They have raised concerns about the possibility of anticompetitive practices, specifically when these agreements involve a brand producer paying a generic producer to delay the entry of the generic into the market.

(b)

- (i) Describe legislation that focuses on intellectual property reforms for the pharmaceutical industry.
- (ii) Explain what strategies from (a) this legislation is addressing.

### **Commentary on Question:**

*Candidates performed well on part B. Most candidates were able to recall the intellectual property reforms that were described in the source material.*

*Candidates achieved the most points when they were able to tie back their response in part B to the strategies listed in part A.*

- **CREATES Act of 2019:** Attempts to make samples more easily accessible for generic manufacturers. The bill allows generics to bring action in federal court to obtain samples needed for bioequivalence analyses and allows for limited damages to be awarded in particularly egregious cases of sample withholding.
- **Preserve Access to Affordable Generics and Biosimilars Act:** prohibits settlement agreements where a branded drug firm pays a potential generic competitor to abandon a patent challenge and delay entering the market. Addresses pay for delay strategy.
- **The Prescription Drug Price Relief Act:** would legislate the voiding of patent rights and regulatory exclusivity on pharmaceutical products if the prices of covered drugs were found to be excessive. Not directly tied to strategies above.
- **FLAT Prices Act:** shorten regulatory exclusivity periods by 180 days if the price of a drug increased by more than 10 percent over a 12-month period, 18 percent over a 24-month period or 25 percent over a 36-month period. Not directly tied to strategies above.
- **The Biologic Patent Transparency Act:** closes the gap in information required by the FDA's Orange Book and Purple Book. While patent information is contained in the Orange Book, the Purple Book does not contain patent information. This impacts the ability of biologic biosimilar manufacturers to use an ANDA application to resolve patent disputes via the Hatch-Waxman Act. This addresses withholding samples.

## 7. Continued

- **The Affordable Prescriptions for Patients Act:** codifies definitions of patent thicketing and product hopping within the FTC Act, which could enable the FTC to bring antitrust suits against companies that employ these strategies in abusive ways. Addresses patent thicketing and product hopping.
- (c) Explain the actuarial implications of this variance for your company, the covered employers, and their employees.

### **Commentary on Question:**

*The intent of part C was to identify potential implications of generic and branded drugs for the insurer, employers and employees. Since the question did not specify between funding types, candidate were able to offer the impact in either funding scenario. If the candidate was able to explain the impact, they were given credit. The most common mistakes on this question were not identifying who the impacted party was and confusing the impact of the GDP going down.*

### The Company:

- Trend Would be Too Low / PMPM costs would be higher than expected: Generic drugs are generally less expensive than branded drugs and we would expect the cost per script to go up.
- Formulary Implications: Formulary developed based on assumptions on Branded vs. Generic drugs. New information may have changed how you would have build the formulary
- Rebates: Rebates may look different than initially expected based on contracts

### The Employer:

- If self-insured customer, they would experience higher than expected drug costs
- If fully insured, may expected future rate increases based on higher than expected drug costs

### The Employee

- Cost to the member may be impacted if the drugs are generic or not
- Cost to the member may impact the ability of the member to continue to take drug / impact health of the member



## 8. Learning Objectives:

3. The candidate will understand how to evaluate the impact of regulation and taxation on companies and plan sponsors in the US.

### Learning Outcomes:

(3b) Describe the major applicable laws and regulations and evaluate their impact.

(3d) Apply applicable standards of practice.

### Sources:

Group Insurance, Skwire 8th Edition, Chapter 16

ASOP No. 8

### Commentary on Question:

*Candidates who performed well on this question were those who paid attention to the type of responses being requested (i.e., Assess and Justify, List and Describe) and who were able to recall and apply knowledge from the source materials to provide thoughtful responses. Part (a) in particular was testing the candidates' ability to think through the given prompts and to provide recommendations. Part (b) did not require the same levels of knowledge application, and candidates who were able to identify and recall the source material being referenced generally performed well.*

### Solution:

- (a)
  - (i) Identify the type of PPO Regulation each recommendation potentially violates.
  - (ii) Assess the likelihood of each recommendation violating state law into: likely, unlikely, or not enough information. Justify your answer.

### Commentary on Question:

*Part (a) required students to read the question narrative and use common sense – similar to a work environment. The question narrative often provided clues as to how to answer part ii of this question. For instance, item 5 proposes using centers of excellence for transplants and rare cancer. The narrative says the market leader uses a few select providers, so clearly the center of excellence approach is legal in this state.*

*For the Classification piece, the graders were looking for specific regulation names (i.e., “Provider Protection”, “Freedom of Choice”, “Anti Trust”). Many candidates missed out on points for giving only an assessment, missing the justification. No credit was given for the Assessment section without justification. In cases where the candidate did not provide the same assessment as the model solution but gave a satisfactory justification, credit was given.*

## 8. Continued

*Additional credit was given for candidates who were able to provide sufficient background across parts (i) and (ii) to show they understood the general dynamics of the PPO Regulations and how they came into play in the question scenario.*

*For companies that don't mind disruption, there should be an option for an Exclusive Provider Organization (EPO) as well. We would be the only one in the market who does this. It could be a big win!*

**Classification:** Provider Protection

**Assessment:** Likely – no one else has an EPO

**Description:** It is likely the state has “any-willing provider laws” given no one else offers an EPO

*For the broader PPO, let's be selective who our In-Network providers are and only look for efficient & effective providers*

**Classification:** Provider Protection OR Consumer Protection

**Assessment:** Likely – could be too similar to an EPO

**Description:**

**If Provider Protection** – This may violate any-willing-provider laws

**If Consumer Protection** – This could limit availability & accessibility. Additionally, quality is difficult to measure and there may be laws about this.

*Our benefit differentials shouldn't be TOO large, maybe 20% at most, between in and out of network benefits.*

**Classification:** Provider Protection OR Freedom of Choice

**Assessment:** unlikely – 20% is not very high

**Description**

**If Provider Protection:** This may violate any-willing-provider.

**If Freedom of Choice** – If differential is too large, employee may literally not be able to go to non-preferred providers due to financial barrier.

## 8. Continued

*To keep costs down, let's exclude all chiropractic care. None of the competitors offer this benefit.*

**Classification** – Provider Protection

**Assessment** – Not enough information. We don't know the competitive landscape.

**Description** – Allied medical practitioners may be mandated benefits/inclusions

*For high impact claims, like transplants, we should ONLY let members use our closest hospital partner. It might mean people need to travel a few hours to get there, but it is worth it because we know they do a great job and will limit issues post operation. The current market leader in membership does this with transplants and rare cancer diagnosis. We should definitely follow suit.*

**Classification** – Freedom of Choice

**Assessment** - Unlikely. If the market leader already does this, it is likely we can too.

**Description** – Many states DO have statutes that prohibit provisions requiring a medical service be rendered at a particular doctor or hospital.

*There is no time to build a Utilization Review team so let's talk to corporate and we can find a 3<sup>rd</sup> party partner that already operates in the market to do our UR.*

**Classification** – Utilization Review

**Assessment** - Unlikely – if the UR 3<sup>rd</sup> party is already in the state, it already has all necessary licenses and follow rules/regulations.

**Description** – There are a variety of regulations that the 3<sup>rd</sup> party would need to ensure it is following, including but not limited to UR procedures and criteria, restrictions on access to medical information, etc.

*I know we have an in with Hospital A in the state capital (the CFO there used to work for us), and they have an extensive provider network. Maybe we can work that connection to get a Most Favored Nations clause on our discounts with them.*

**Classification** – Anti Trust

**Assessment** – Not enough information. MFN clauses can be both anti and pro competition.

## 8. Continued

**Description** – Some states have outlawed these because there is a DOMINANT insurer and having an MFN would be anti-competitive.

*For Rx, we can retain 100% of the rebates. This will allow us to have higher levels of profit!*

**Classification** – Pharmacy Laws

**Assessment** - Not enough information. We have no market information.

**Description** – If this profit is kept and not disclosed as part of our Medical Loss calculation it would violate the ACA laws.

- (b) List and describe the applicable issues and recommended practices when preparing a rate filing.

**Commentary on Question:**

*Graders were looking for answers based on the information contained within ASOP No. 8. A number of candidates provided answers summarizing requirements specific to ACA rate filings (e.g., the URRT, etc.). Partial credit was given in these instances where possible when there was overlap with the items given in the model solution below.*

List: Purpose of Filing

Definition: the filing actuary should include in the filing a statement of its purpose, identifying the applicable law with which it is intended to comply.

List: Rating Calculations

Definition: The actuary should review and understand the formulas used to calculate premium rates and determine that, based on the available data and relevant assumptions, they are appropriate for the purpose of setting premium rates.

List: Use of Business Plans to Project Future Results

Definition: The filing actuary should request and, if available, review relevant business plans for the health plan entity or health benefit plan that is the subject of the filing. The filing actuary should consider the information therein along with any other information relevant to the business plan as a part of the setting of the assumptions and methodologies used in the filing

List: Use of Past Experience to Project Future Results

Definition: The actuary should determine whether past claims experience can be used to project future results. The actuary should also determine the extent to which past experience trends are relevant to assumed future trends.

## 8. Continued

List: Recognition of Plan Provisions

Definition: The actuary should consider pertinent plan documents or contracts, established administrative procedures, and any arrangements with providers of health care that affect plan administration

List: Rating Factors

Definition: For medical expense coverages, the actuary should be familiar with the rating factors used for the plans and the structure of those factors. The actuary should be familiar with the regulatory requirements for rating factors and structures.

List: New Plans or Benefits

Definition: The actuary should consider available data relevant to new plans or benefits. In the absence of sufficient data, the actuary should use data from similar benefits or plans of coverage that are reasonably consistent with the new plans or benefits.

List: Projection of Future Capital and Surplus

Definition: As part of a health filing, the filing actuary may be called upon to project future capital and surplus for the entire health plan entity or a portion of it, such as a business unit. In doing so, the filing actuary should base the projection on reasonable assumptions that take into account any internal or external future actions known to the filing actuary that, in the filing actuary's professional judgment, are likely to have a material effect on capital or surplus.

List: Regulatory Benchmark

Definition: The actuary may be called upon to project results in relation to a regulatory benchmark for the entire health plan entity or a portion of it, such as a line of business, including but not limited to Rate Adequacy, Rates not excessive, Rates not Unfairly Discriminatory, and Projected Loss Ratios.

List: Reasonableness of Assumptions

Definition: The assumptions should be reasonable in the aggregate and for each assumption individually. The support for reasonableness should be determined based on the actuary's professional judgment, using relevant information available to the actuary.

List: Reliance on Data or Other Information Supplied by Others

Definition: When relying on data or other information supplied by others, the filing actuary should refer to ASOP No. 23, Data Quality, for guidance. The filing actuary should disclose any such reliance in accordance with ASOP No. 41.

## 8. Continued

List: Documentation

Definition: The actuary should prepare and retain documentation in compliance with the requirements of ASOP No. 41. The actuary should also prepare and retain documentation to demonstrate compliance with the disclosure requirements of section 4.1.

## 9. Learning Objectives:

2. The candidate will understand how to prepare and be able to interpret insurance company financial statements in accordance with U.S. statutory principles and GAAP.”

### Learning Outcomes:

- (2b) Interpret the results of both statutory and GAAP statements from the viewpoint of various stakeholders, including regulators, senior management, investors.”

### Sources:

GHVR-819-18 AAA, Practices for Preparing Health Contract Reserves

### Commentary on Question:

*This question tests the candidate’s knowledge of contract reserves and the 3 different accounting approaches (SAP, Tax and GAAP) to calculating them.*

### Solution:

- (a) Compare and contrast the SAP and GAAP guidance on contract reserves.

### Commentary on Question:

*Many candidates struggled with this question, earning less than 25% of the available points on average. It seemed like many candidates relied on their working knowledge of contract reserves rather than drawing specifics from the source material. Most candidates understood and commented on the purpose of contract reserves; but, to obtain full credit, candidates needed to compare and contrast the specific components of SAP vs GAAP guidance – which most did not.*

### SAP

- SAP separates contracts into the following 4 types: Accident and health, P&C, Life, and deposit type.
- For accident and health, a policy that has contract reserves will use the net Unearned premium reserve and the contract reserve.
- Reserve method is a 2-year full preliminary term, and a 1 year FPT for long term care.
- Assumptions are set using minimum standards, and are implicitly locked in.
- Assumptions should be set conservatively, and the value of the reserve should be at least as great as the minimum state reserve.

### GAAP

- The policies must be grouped into either short term or long term policies.
- For short term policies, a contract reserve should not be used.
- For long term policies, a contract reserve should be used.
- A provision for adverse deviation should be added.

## 9. Continued

- Set assumptions using realistic assumptions to the business, and then assumptions are locked in.
- Assumptions are allowed to be unlocked if there is a premium deficiency.
- Contract reserves under GAAP should be greater than best estimate, but less than under SAP.
- Contract reserves are set with the Net level premium method.

### Both

- For both GAAP and SAP, an addition reserve may need to be added if there is a gross premium deficiency.
- Both GAAP and SAP calculate the contract reserve as the present value of future benefits and expenses minus the present value of the future premiums.
- Both GAAP and SAP need to set up a contract reserve if a policy is long term, noncancellable, has level premiums, and there is a need to pre fund future increases in claims cost.

- (b) Describe the tax implications for contract reserves.

### **Commentary on Question:**

*Candidates struggled on this question. Many candidates only commented on the tax deductibility of various contract reserves but fell short of describing any other guidance on tax reserves.*

- Contract reserves are tax deductible if certain conditions are met.
- Lapse assumptions are those used to compute statutory reserves.
- The method to calculate them must be the 2 year FPT method, with 1 year for LTC.
- The value of the tax reserve must never be higher than the value of the reserve itself.  
Premium deficiency reserves, on the other hand, are not tax deductible

- (c) Describe different methods of modifying contract reserve factors.

### **Commentary on Question:**

*Candidates performed well on this section in general. However, candidates tended to either obtain full-credit or earn almost no credit. Candidates either knew these methods earning them full-credit, or tended to describe smoothing methods of other types of reserves earning them low or no credit. Many candidates discussed the implications of unlocking GAAP assumptions, which also was not awarded credit.*



## 9. Continued

- Do nothing approach: This is where you do nothing to modify contract reserve factors, and assume there will be a premium increase to offset the increased claims cost.
- Benefit rider approach: This is where you add a benefit rider contract reserve that represents the increased cost from the claims increase.
- Proportional approach: This is where you increase assumptions and reserves proportionally to the increase in claims.
- Loss ratio method: this is where you use the loss ratio (Claims/Premium) to increase the contract reserves factors when there is an expected increase in claims cost.