7. (5.75 points)

Given the following information as of December 31, 2017:

Cumulative Reported Claim Counts as of (months)			
Accident Year	12	24	36
2015	480	456	447
2016	560	532	
2017	590		

Cumulative Reported Loss + ALAE ($) as of (months)			
Accident Year	12	24	36
2015	7,200,000	8,208,000	8,850,600
2016	8,120,000	9,256,800	
2017	9,145,000		

$98,000	Expected reinsurance recoveries
$318,000	Cost of reinsurance (expected ceded premium)
3%	Expected annual exposure increase

Calendar Year	Earned Exposures
2015	14,000
2016	15,000
2017	17,000

5%	ULAE provision as a percent of loss and ALAE
3%	Annual pure premium trend
$21	Projected fixed expenses per exposure
15%	Variable expense ratio
10%	Profit provision
2%	Contingency provision
$950	On-leveled and projected earned premium per exposure

- Exposures are written evenly throughout each year.
- All policies are annual.
- There is no loss development or claim count development beyond 36 months.
- The reinsurance contract has a 12 month term length and an effective date of January 1, 2019.
- Rates are to be in effect for one year.
- Rate revision is planned to be effective April 1, 2019.

a. (1 point)

Calculate the projected net reinsurance cost per exposure using a 12-month term for the reinsurance contract.

b. (2 points)

Calculate the ultimate losses and ALAE for each accident year using an appropriate frequency-severity technique.

c. (1.75 points)

Calculate the projected pure premium per exposure using even weights across the three accident years.

d. (1 point)

Calculate the indicated rate change.

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QUESTION 7

TOTAL POINT VALUE: 5.75 | **LEARNING OBJECTIVE(S): A3, A5, B3**

SAMPLE ANSWERS

Part a: 1 point

Expected net reinsurance cost = 318,000 – 98,000 = $220,000
Trend from 7/1/2017 to 7/1/2019, trend period is 2 yr.
Projected earned exposure in CY 2019 = (1 + 0.03)^2 * 17,000 = 18,035
Projected net reinsurance cost per exposure = 220,000 / 18,035 = $12.2

Part b: 2 points

Sample 1

Cumulative Severity Triangle

AY	12	24	36
2015	15,000	18,000	19,800
2016	14,500	17,400	
2017	15,500		

Sev. LDF

AY	12-24	24-36	36-ult
2015	1.2	1.1	1
2016	1.2		
Selected	1.2	1.1	1
CDF to ult	1.32	1.1	1

Claim Count LDF

AY	12-24	24-36	36-ult
2015	0.95	0.98	1
2016	0.95		
Selected	0.95	0.98	1
CDF to ult	0.931	0.98	1

Ultimate loss and ALAE:
AY
2015: 8,850,600 * 1 * 1 = 8,850,600
2016: 9,256,800 * 1.1 * 0.98 = 9,978,830
2017: 9,145,000 * 1.32 * 0.931 = 11,238,473

Sample 2

LDFs for Reported Claim Count

AY	12-24	24-36	36-Ult
2015	456/480 = 0.95	447/456 = .98	
2016	532/560 = .95		
average = selected	0.95	0.95	
Age to Ult	0.98 * 0.95 = 0.931	0.98	1.00

Reported Severity = Reported Claims / Reported Count

AY	12	24	36
2015	15,000	18,000	8,850,600 / 447 = 19,800
2016	14,500	17,400	
2017	15,500		

LDFs Reported Severity

AY	12-24	24-36	36-Ult
2015	18,000 / 15,000 = 1.20	1.10	
2016	1.20		
average = selected	1.20	1.10	
Age to Ult	1.32	1.10	1.00

AY	(1) Reported Claim Count	(2) Count CDF	(3) = (1)*(2) Ultimate Count	(4) Reported Severity	(5) Severity CDF	(6) = (4)*(5) Ultimate Severity
2015	447	1.00	447	19,800	1.00	19,800
2016	532	0.98	521	17,400	1.10	19,140
2017	590	0.931	549	15,500	1.32	20,460

AY	Ultimate Loss & ALAE (7) = (3) * (6)
2015	447 * 19,800 = 8,850,600
2016	9,971,940
2017	11,232,540

Sample 3

AY	12	24	36
2015	0.034	0.033	0.032
2016	0.037	0.035	
2017	0.035		

Sev

AY	12	24	36
2015	15,000	18,000	19,800
2016	14,500	17,400	
2017	15,500		

LDFs Sev.

AY	12	24	36
2015	1.2	1.1	
2016	1.2		
Sel	1.2		
CDF	1.32	1.1	1.0

LDF Freq.

AY	12	24	36
2015	0.971	0.97	
2016	0.946		
Sel	0.9585	0.97	1.0
CDF	0.9297	0.97	1.0

AY	Ult Count	Ult Sev	Ult Claims
2015	447	19,800	8,850,600
2016	516	19,140	9,876,240
2017	549	20,460	11,232,540

Part c: 1.75 points

Year	(1) Earned Exposure	(2) Loss	(3) Pure Premium Trend	(2) / (1) * (3) Pure Prem per Exposure
2015	14,000	8,850,600	1.03 ^ 4.75	727
2016	15,000	9,978,830	1.03 ^ 3.75	743
2017	17,000	11,238,473	1.03 ^ 2.75	717
			Average	729

Trend from 7/1 of 2015, 2016 and 2017 to 4/1/2020
Projected pure prem per exposure = 1/3 * (727 + 743 + 717) = 729

Part d: 1 point

Sample 1

LR = 729 / 950
Fixed expense ratio = 21 / 950
Net reinsurance ratio = 12.2 / 950

Indicated rate change = [(729/950) * (1.05) + 21/950 + 12.2/950] / (1 – 15% - 10% - 2%) – 1
= 15.16%

Sample 2

Ind rate = (765.73 + 21 + 12.20) / (1 – 15% - 10% - 2%) = 1,094

Ind rate chg = 1,094 / 950 – 1 = 15.2%

EXAMINER'S REPORT

This question required candidates to understand indication loss adjustments, including trend and loss development, and calculation of the overall indication. Candidates were expected to demonstrate knowledge of a frequency-severity loss development technique and understand basic reinsurance concepts.

Part a

Candidates were expected to calculate the net cost of reinsurance and project the latest year's exposures forward to the period covered by the reinsurance contract in order to determine the projected net reinsurance cost per exposure.

Common mistakes include:

- Incorrectly calculating the projection period for which to apply the exposure trend
- Not including the expected reinsurance recoveries in the net reinsurance cost calculation
- Using the sum of exposures over multiple accident years rather than the exposures from the latest accident year to determine projected exposures

Part b

Candidates were expected to use a frequency-severity technique to develop claim counts and severities to ultimate levels for each accident year and use those results to determine the ultimate losses and ALAE for each accident year.

Common mistakes include:

- Using the chain ladder method rather than a frequency-severity technique to determine ultimate losses
- Using a frequency-severity technique that involved trending, but not applying the appropriate trend for all components of the technique

Part c

Candidates were expected to calculate the loss trend period for each accident year, trend losses, apply the ULAE factor, and determine the projected pure premium. Credit was given to candidates that omitted ULAE from the response to this part of the question if it was correctly included in the response to part d.

Common mistakes included:

- Calculating the pure premium using losses and exposures summed across accident years rather than applying equal weights to each year's pure premium
- Trending the exposures used to calculate pure premium

Part d

Candidates were expected to calculate the indicated premium and indicated rate level change.

Common mistakes included:

- Omitting the net reinsurance cost per exposure from the calculation of the indicated premium
- Omitting or incorrectly including the contingency provision when calculating the indicated premium