

**SPRING 2018 – ORIGINAL EXAM
EXAMINER’S REPORT**

GENERAL COMMENTS:

- Candidates should note that the instructions to the exam explicitly say to show all work; graders expect to see enough support in the candidate’s response to follow the calculations performed. While the graders made every attempt to follow calculations that were not well-documented, lack of documentation may result in the deduction of points where the calculations cannot be followed or are not sufficiently supported. This concept is applicable in the TBE environment; while multiple steps of a calculation may be combined into a single cell, candidates should take care to clearly label their work to help ensure the graders understand what the candidate is attempting to calculate to maximize partial credit.
- In the TBE environment, some candidates opted to copy and paste the information provided in the question to the space available for candidate responses. This is not required to answer the question as the information in the question can be directly linked to. Some candidates who chose to do this introduced errors into their work by copying and pasting only a portion of the information, or copying and pasting incorrectly.
- Candidates should justify all selections when prompted to do so. For example, if the candidate selects an all year average and the question prompts a justification of all selections, a brief explanation should be provided for the reasoning behind this selection. Candidates should note that a restatement of a numerical selection in words is not a justification.
- Incorrect responses in one part of a question did not preclude candidates from receiving credit for correct work on subsequent parts of the question that depended upon that response.
- Candidates should try to be cognizant of the way an exam question is worded. They must look for key words such as “briefly” or “fully” within the problem. We refer candidates to the Future Fellows article from December 2009 entitled “The Importance of Adverbs” for additional information on this topic.
- Some candidates provided lengthy responses to a “briefly describe” question, which does not provide extra credit and only takes up additional time during the exam.
- Candidates should note that the sample answers provided in the sample solutions file are not an exhaustive representation of all responses given credit during grading, but rather the most common correct responses.
- In cases where a given number of items were requested (e.g., “three reasons” or “two scenarios”), the sample solutions will include multiple solutions that cumulate to more sample answers than the requested number. The additional responses are provided for educational value, and would not have resulted in any additional credit for candidates who provided more than the requested number of responses. Candidates are reminded that, per the instructions to the exam, when a specific number of items is requested, only the items adding up to that number will be graded (i.e., if two items are requested and three are provided, only the first two are graded).
- It should be noted that all exam questions have been written and graded based on information included in materials that have been directly referenced in the official syllabus, which is located on the CAS website. The CAS takes no responsibility for the content of supplementary study

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materials and/or manuals produced by outside corporations and/or individuals which are not directly referenced in the official syllabus.

EXAM STATISTICS:

- Available Points (original exam): 55.5
- Passing Score (original exam): 42
- Number of Candidates (original exam and make-up exam combined): 928
- Number of Passing Candidates (original exam and make-up exam combined): 557
- Raw Pass Ratio (original exam and make-up exam combined): 60.0%
- Effective Pass Ratio (original exam and make-up exam combined): 63.1%

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QUESTION 1	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE(S): A1
EXAMINER'S REPORT	
Candidates were expected to demonstrate how to calculate written and earned exposures on calendar year and policy year bases. Candidates were also expected to understand the three criteria of an exposure base.	
Part a	
Candidates were expected to calculate written exposures in the calendar year the policies were effective. Common errors included: <ul style="list-style-type: none">• Not properly accounting for mid-term cancellation of policies.	
Part b	
Candidates were expected to calculate earned exposures in the calendar year the policies were effective. Common errors included: <ul style="list-style-type: none">• Miscalculation of percent earned in calendar year.• Not properly accounting for mid-term cancellation of policies.	
Part c	
Candidates were expected to calculate written exposures on a policy year basis. Common errors included: <ul style="list-style-type: none">• Failing to distinguish the difference between policy year and calendar year.	
Part d	
Candidates were expected to know the three criteria of a good exposure base and evaluate a potential exposure base using each criterion: proportional to expected loss, practical, and historical precedence. Candidates were expected to evaluate the proposed exposure base by explaining why they believed it met or did not meet each of the three criteria. <ul style="list-style-type: none">• Proportional to expected loss: candidates needed to demonstrate that there was or wasn't a relationship between number of occupants and expected loss.• Practical: candidates needed to demonstrate it would or wouldn't be practical based on whether it was or wasn't objectively defined, easy/inexpensive to obtain, easy/inexpensive to verify, or subject to manipulation.• Historical Precedence: candidates needed to demonstrate whether or not this was met by explaining the change of base based on either impact to systems (IT costs), impact to policyholders (premium swings) or data (current data would be difficult to work with, there would be a lack of industry benchmarks, etc.). Common errors included: <ul style="list-style-type: none">• Simply listing the criteria, or only stating that the proposed exposure base met or did not meet the criteria without any further explanation.	

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- Proportional to Expected Loss: only saying that it is more/less proportional than house-years.
- Practical: saying it is practical or impractical without explanation.
- Historical Precedence: only stating that the current base is house-years, so number of occupants doesn't meet historical precedence, or just saying assuming number of occupants is current base, so it is met (and not making the connection that there would be a lack of industry benchmarks).

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QUESTION 2	
TOTAL POINT VALUE: 1.25	LEARNING OBJECTIVE(S): A3
EXAMINER'S REPORT	
<p>Candidates were expected to calculate the Buhlmann Credibility, the complement of credibility and the credibility-weighted indicated premium.</p> <p>Common errors included:</p> <ul style="list-style-type: none">• Using the wrong formulas for Z and/or K .• Using the incorrect trend period or applying trend incorrectly.• Incorrectly calculating the residual indication.	

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QUESTION 3	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE(S): A3
EXAMINER'S REPORT	
Candidates were expected to discuss the pros/cons of using competitor data and internal data for an insurer who had entered a new state in the prior year. They were also expected to demonstrate their knowledge of loss trend and loss development concepts and explain why they do not overlap.	
Part a	
Candidates were expected to demonstrate their understanding of different data sources and their relative merits in a certain situation. They needed to understand concepts such as credibility, differences in mix of business, differences in loss behavior between states, or availability of data, and discuss the advantages/disadvantages these presented in each case.	
Common errors for part i. included:	
<ul style="list-style-type: none">• Saying competitor data could be biased (or unbiased) without stating why.• Saying this would allow the insurer to be competitive. Competitiveness of rates should not be a consideration when selecting loss trends.	
Common errors for part ii. included:	
<ul style="list-style-type: none">• Saying internal data could be biased (or unbiased) without stating why.• Saying internal data would not be independent (as a disadvantage) without stating why this is a disadvantage.	
Part b	
Candidates were expected to describe the overlap fallacy and state why it is false. In doing this, they needed to demonstrate their understanding of the loss development and loss trend concepts, and why they do not overlap.	
Common errors included:	
<ul style="list-style-type: none">• No explicit statement that trending/development do not overlap.• Inaccurate or missing descriptions of trending/development.• Stating that the fallacy is true, or that the effects do have overlap.	

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QUESTION 4	
TOTAL POINT VALUE: 1.75	LEARNING OBJECTIVE(S): A3
EXAMINER’S REPORT	
Candidates were expected to understand how to calculate an exposure credibility standard using classical credibility, understand the advantages and disadvantages of certain aspects of classical credibility, and understand what makes a good complement of credibility.	
Part a	
Candidates were expected to understand how to calculate a full credibility exposure standard using classical credibility. Additionally, candidates were expected to make a selection for expected frequency to use in the calculation.	
Common errors included: <ul style="list-style-type: none">• Combining the calculation for bodily injury and collision. The question specifically asked for exposures needed for full credibility for each coverage.• Calculating full credibility standard based on the frequency of each year without making a selection.	
Part b	
Candidates were expected to understand the potential advantages of using an exposure standard over a claim standard.	
Common errors included: <ul style="list-style-type: none">• Stating that credibility would be higher since there are more exposures than claims. The credibility standard will also be higher for exposure, so this is not true.• Stating that exposure is preferred for lines of business with low frequency because the claim count may never reach full credibility. For these lines, the exposure standard would be similarly high.	
Part c	
Candidates were expected to understand the advantages and disadvantages of classical credibility.	
Common errors included: <ul style="list-style-type: none">• Stating advantages/disadvantages that were general to credibility, not specific to classical credibility, such as it smooths indications by weighting experience with credibility standard.• Stating incorrect assumptions about classical credibility, such as losses are assumed to follow a normal distribution. In classical credibility, losses have constant severity and Poisson frequency.• Vague responses such as “inaccurate” or “biased”, without any further explanation. Any method could be biased or inaccurate.	
Part d	
Candidates were expected to propose a reasonable complement of credibility and discuss the advantages/disadvantages of that complement.	
Common errors included:	

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- Not providing any discussion of the advantages/disadvantages of the selected compliment.
- Stating incorrect assumptions about classical credibility, such as losses are assumed to follow a normal distribution. In classical credibility, losses have constant severity and Poisson frequency.
- Vague responses such as "inaccurate" or "biased", without any further explanation. Any method could be biased or inaccurate.

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QUESTION 5	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): A3
EXAMINER'S REPORT	
Candidates were expected to calculate an excess loss factor for property insurance utilizing ground up loss data including catastrophes. Candidates were also expected to describe the purpose for incorporating an excess loss factor into the ratemaking process in lieu of unadjusted loss data.	
Part a	
Candidates were expected to calculate an excess loss factor by calculating losses limited to \$500k (non-excess losses) and losses excess of \$500k (excess losses). Losses were provided ground up split into two categories, losses < \$500k and losses >\$500k. Candidates needed to split the losses > \$500k into non-excess losses and excess losses, while all losses < \$500k fell into the non-excess losses. The excess loss factor was calculated as the ratio of excess losses to non-excess losses + 1. Three cat treatments were accepted: <ol style="list-style-type: none">1. Calculating a non-cat excess loss factor, i.e. excluding all catastrophes from the loss data2. Calculating an excess loss factor for both non-cat and cat losses, i.e. including all data3. Calculating a combined cat load and excess loss factor, i.e. ground up cat losses plus excess non-cat losses	
Common errors included: <ul style="list-style-type: none">• Calculating an excess loss ratio, as the question explicitly asked for an excess loss factor.• Calculating the excess loss factor as 1 – Loss Elimination Ratio.• Calculating the excess loss factor as Excess Losses / Total Losses.• The data was presented as ground up losses for two categories – losses less than \$500k and losses greater than \$500k. Some candidates misinterpreted the buckets to be limited and excess losses and made no adjustments to split the losses >\$500k into non-excess and excess losses.• Treating the data as if it were censored data, as the labels in the table clearly note the data is ground up.	
Part b	
Candidates were expected to identify the volatility inherent in excess / catastrophe losses from year to year and describe how incorporating the excess loss factor approach in premium / rate indications will smooth out results by capping losses and adding on a longer-term average of excess / catastrophe losses.	
Common errors included: <ul style="list-style-type: none">• Not expanding on reason for using excess loss factor.• Using excess loss factors to accommodate censored data, as ELFs are not used to account for data limitations but rather to smooth out volatility.• For use in reinsurance pricing or determining layers to reinsure, as ELFs may be used in the process of pricing reinsurance but would not be the reason to incorporate ELFs in the ratemaking process.	

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QUESTION 6	
TOTAL POINT VALUE: 1.75	LEARNING OBJECTIVE(S): A3
EXAMINER'S REPORT	
Candidates were expected to understand both claims-made and occurrence coverage, how to apply those terms to claim data, and how each coverage responds when there is a change in coverage type. Candidates were expected to recognize a cumulative triangle and develop the immature years to ultimate.	
Part a	
Candidates were expected to know which claims were covered under a claims-made policy given a specific retroactive date.	
Common errors included: <ul style="list-style-type: none">• Not realizing that the data was in a cumulative format.• Incorrect application of the retroactive date.	
Part b	
Candidates were expected to know which claims were covered under an occurrence policy given a specific effective date.	
Common errors included: <ul style="list-style-type: none">• Not realizing that the data was in a cumulative format• Not properly reflecting what is covered under the Occurrence policies.	
Part c	
Candidates were expected to develop claims count to ultimate using either the given step factors or by deriving LDFs. Candidates were also expected to explain why there was a gap in coverage from a switch of policy type and which claims would be affected.	
Common errors included: <ul style="list-style-type: none">• Not being precise enough in their explanation of the coverage gap. The explanation was expected to include that the claims had to occur during the claims-made policy and that they were reported during the occurrence policy.• Not realizing that the triangle was in a cumulative format.• Not developing the claim count triangle to ultimate.• Not properly using the step factor provided.• Not using the most recent reported to date claim count to develop to ultimate.• Applying incremental LDF to develop claim count to ultimate.	
Part d	
Candidates were expected to know which additional coverage could be purchased to cover the gap between the claims-made policy and the occurrence policy.	
Common errors included: <ul style="list-style-type: none">• Simply stating purchasing "gap coverage", "an extension", or "an endorsement" as these responses are too vague. For example, not all endorsements to a policy would be a solution to the coverage gap.	

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QUESTION 7	
TOTAL POINT VALUE: 1.75	LEARNING OBJECTIVE(S): A4, A9
EXAMINER’S REPORT	
<p>Candidates were expected to demonstrate knowledge pertaining to the development of a fixed expense fee per exposure. Candidates were expected to split expenses into fixed and variable components; generate fixed and variable expense provisions by expense type (general, other acquisition, taxes, licenses & fees, and commissions); develop an average fixed expense amount per exposure; develop a variable expense provision as a proportion of premium; and ultimately calculate a fixed expense fee by incorporating variable expense and underwriting profit provisions.</p>	
<p>Common errors included:</p> <ul style="list-style-type: none">• Not developing a fixed expense fee after calculating an average fixed expense per exposure.• Not developing a variable expense provision or incorrectly using exposures in the denominator to develop the provision.• Not using the correct exposures in the denominator to develop the average fixed expense (e.g. using written exposures for general expenses or using countrywide exposures for the state taxes, licenses & fees).• Developing the fixed expense as a percentage of premium using the correct written/earned, state/countrywide premiums, but then using a single ratio of premium to exposure to convert all expenses back to an average fixed expense per exposure (e.g. using countrywide earned premium per exposure for the other acquisition expenses and taxes, licenses and fees).• Not grossing up the final fixed expense fee to reflect the cost in dollars (i.e., candidates were expected to multiply the numerator at some point in the calculation by \$1,000 to result in the correct expense fee <u>per policy</u>).	

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QUESTION 8	
TOTAL POINT VALUE: 6.5	LEARNING OBJECTIVE(S): A2, A5, B3
EXAMINER'S REPORT	
Candidates were expected to use the Cape Cod technique to calculate ultimate losses and incorporate the result into development of an overall indicated rate change.	
Part a	
Candidates were expected to determine the appropriate trend period to be applied to earned premium and reported losses. In addition, candidates needed to incorporate on-leveling to determine used up premium and the expected claim ratio within the Cape Cod method.	
Candidates were also expected to apply de-trending to the expected claim ratio in development of the ultimate claims by year.	
Alternatively, the candidate could have brought all premiums to the average rate level for 2017 rather than current rate level through the on-leveling calculation.	
Common errors included:	
<ul style="list-style-type: none">• Incorrectly calculating the on-level factors.• Not using the appropriate trend period for losses and premium or using no trending at all.• Using trended, developed losses in the expected claim ratio calculation instead of trended losses.• Not incorporate trend or on-leveling when determining the expected claims ratio by year.• For candidates that did not incorporate net trend within the expected claims ratio by year calculation, multiplying the expected claim ratio by on-level earned premium or trended on-level earned premium.• Including ULAE within the calculation.• In developing the final ultimate claims, adding trended reported losses to the unreported losses instead of adding untrended reported losses.	
Part b	
Candidates were expected to trend premium and ultimate losses developed in part a. to calculate an overall rate indication.	
Common errors included:	
<ul style="list-style-type: none">• Not using the appropriate trend period for losses and premium or using the same trend period as determined in part a.	

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QUESTION 9	
TOTAL POINT VALUE: 1.75	LEARNING OBJECTIVE(S): A6
EXAMINER'S REPORT	
Candidates were expected to:	
<ul style="list-style-type: none">• Recognize the effect of persistency on premium volumes and profit dollars over a three-year horizon. This includes recognizing that the renewal probability is cumulative over the three years.• Accurately discount cash flows (premiums, losses, expenses) over the three-year period.• Calculate an underwriting profit measure that relates dollars of profit to premiums, incorporating both losses and expenses as part of the costs.• Draw a conclusion on which of the two age groups provides the higher profit percentage over the three-year lifetime of the policy terms.	
Common errors included:	
<ul style="list-style-type: none">• Not using a cumulative measure of persistency on year 3 or not using persistency at all in the calculations.• Improper discounting of cash flows, including the use of incorrect discount factors or discounting only premium amounts.• Not using discounted premiums in the calculation of a profit percentage.	

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QUESTION 10	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): A7
EXAMINER’S REPORT	
Candidates were expected to demonstrate knowledge on the evaluation of practical considerations for the insurer and societal impacts of implementing a new variable, vehicle color, into the private passenger auto bodily injury rating plan.	
Part a	
Candidates were expected to make an insightful assessment of adding vehicle color to the private passenger auto bodily injury rating plan, from the operational perspective of the insurer, by providing and supporting two criteria.	
Common errors included:	
<ul style="list-style-type: none">• Simply listing an operational criteria, or failing to provide any reasoning behind the listed criteria. For example, “Objective - yes.”• Not providing support for assertions of whether color satisfied a given operational criteria. For example, “Color is inexpensive to administer.”• Evaluating the same criteria for both responses. For example, “1. Change in rating algorithm might be costly when involving change in the system, especially to the extent of a complicated algorithm. It might cause a large premium swing to insured due to new system cost if implementing a new rating variable. 2. There is no historical data or information on the new implemented rating variable. It would require a new questionnaire set up and survey to the policyholders. It might also incur an additional cost for extra workforce to conduct the survey. Hence, the use of vehicle color is not recommended as it might incur additional expense to the insurer.” Both of these responses are evaluating the “cost” criteria.• Evaluating vehicle color using statistical, social, and/or legal criteria rather than operational criteria. For example, “Vehicle color is not correlated with bodily injury claims, so this would not be a good rating variable to use.”	
Part b	
Candidates were expected make an insightful assessment of adding vehicle color to the private passenger auto bodily injury rating plan, from the perspective of society.	
Common errors included:	
<ul style="list-style-type: none">• Simply listing a social criteria, or for giving no reasoning behind it. For example, “Not causal.”• Not providing support for assertions of whether color satisfied a given social criteria. For example, “Color does not invade insured’s privacy.”• Not tying an assertion back to the perspective of the insured or society. For example, only stating “There is no intuitive relationship between vehicle color and expected BI losses”.• Confusing social criteria with legal or regulatory considerations. For example, “Rating based on color of vehicle is discriminatory. It’s not an accepted risk characteristic, and would likely not hold up in court if someone whose rates increased decided to sue.”	

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QUESTION 11	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE(S): A7
EXAMINER’S REPORT	
Candidates were expected to calculate the profit/loss for two companies after risks moved between the two companies. Using the results of this analysis, candidates were expected to suggest two possible ways for the company with a loss to reduce the risk of insolvency.	
Part a	
Candidates were expected to calculate profit/loss after a specific number of risks moved between the two companies.	
Common errors included:	
<ul style="list-style-type: none">• Not calculating the new risk count correctly.<ul style="list-style-type: none">○ Using incorrect percentage of risks moved.○ Applying correct percentage to total risks instead of High/Low breakdown.• Not using the correct formula to calculate profit/loss.<ul style="list-style-type: none">○ Subtracting expected rate from charged rate instead of other way around.○ Using the charged rate for company A instead of the expected cost to calculate profit/loss for company B.	
Part b	
Candidates were expected to list two possible ways the company with a negative profit could reduce the risk of insolvency.	
Common errors included:	
<ul style="list-style-type: none">• Reduce expenses. Not acceptable because the question states there are “no underwriting expenses or profit provisions.”• Increase investment income. Not acceptable because the question states there are “no underwriting expenses or profit provisions.”• Exit the line of business entirely. Not acceptable because the question states the company only writes one line of business so this is essentially the company shutting down.• Purchase reinsurance. Not acceptable because this is not a mechanism to increase profitability as there is a cost component.• First suggestion is raise rate for high risk and second suggestion is lower rates for low risk. This is not acceptable as two separate responses as it would not reduce the risk of insolvency to do the second point without the first.	

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QUESTION 12	
TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE(S): A8
EXAMINER'S REPORT	
Candidates were expected to perform the pure premium method for class relativities. The mechanics associated with this method and the underlying assumptions were key to being able to execute the calculation and explain the limitations and adjustments.	
Part a	
Candidates were expected to calculate the indicated rate change for each class that achieves a revenue neutral overall change. This included calculating the pure premium, calculating and using the correct credibility formula and off-balance to obtain the percentage rate changes or rate change factors by class.	
Common errors included:	
<ul style="list-style-type: none">• Using severity instead of pure premium.• Using claim count instead of earned exposures.• Not normalizing the relativities.• Calculating the wrong off-balance factor.	
Part b	
Candidates were expected to understand that the pure premium approach assumes a uniform distribution across all other rating variables which could result in a distributional bias. Candidates were expected to describe a reason why the indicated relativities may not match the true relativities..	
A common error was not answering the question asked and instead describing a reason why the actuary may select or choose relativities different than what was indicated, such as:	
<ul style="list-style-type: none">• Using competitive environment as the reason.• Using regulatory environment as the reason.• Mentioning the actuary calculated the indicated relativity wrong.• Using industry data as the credibility complement.	
Part c	
Candidates were expected to know that the pure premium method can be performed using exposures adjusted by the exposure weighted average relativity of the other rating variables.	
Common errors included:	
<ul style="list-style-type: none">• Using the GLM, Multivariate, or loss ratio method (while appropriate methods, this does not answer the question).	

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QUESTION 13	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): A6, A7, A8, A9
EXAMINER’S REPORT	
<p>Candidates were expected to understand how to analyze internal GLM model output for low and high rating variables, compare this output to industry and competitor values, make a recommendation using all of this information, and support the recommendation.</p>	
<p>Common errors included:</p> <ul style="list-style-type: none">• Not discussing the industry and competitor values.• Not articulating reasons for selection, particularly for the low variable where there was less credibility and reliance on some combination of industry and competitor was necessary.• Stating observations about the factors without any reasoning, for example, “the competitor factor is higher than the industry factor.”	

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QUESTION 14	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE(S): A10
EXAMINER’S REPORT	
Candidates were expected to demonstrate an understanding of underinsurance compared to insurance to value and to demonstrate knowledge of coinsurance penalty calculations.	
Part a	
Candidates were expected to calculate coinsurance penalties for varying loss amounts, given specified home and policy characteristics.	
Common errors included:	
<ul style="list-style-type: none">• Not recognizing the need to subtract the indemnity payment from the face value of the policy instead of from the loss amount in part ii.• Not recognizing the need to cap the indemnity payment at the face value of the policy in part iii.• Stating all losses above the face value resulted in a \$0 coinsurance penalty, instead of just those losses above the coinsurance requirement.• Using incorrect values in the calculation of the indemnity payments or penalties.• Calculating only indemnity payments.	
Part b	
Candidates were expected to briefly describe two problems with underinsurance.	
Common errors included:	
<ul style="list-style-type: none">• Using “rates are inequitable or inadequate” or “rates are mispriced” as an issue for the insurer. There are several issues that cause rates to be inequitable or inadequate – candidates needed to demonstrate that they understand the mechanics of underinsurance specifically.• Using “doesn’t have full coverage” or “won’t be fully indemnified for losses” as an issue for the insured without clarifying loss amounts or existence of a coinsurance penalty. An underinsured policy will have full coverage if the loss amount is under the insured amount and there is no coinsurance penalty.• Incorrectly describing how partial losses or the loss distribution contribute to the inadequacy and inequity issues.• Only providing one problem with underinsurance.	

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Question 15	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE(S): A11
EXAMINER'S REPORT	
Candidates were expected to calculate the experience rating modification factor and retrospective premium.	
Part a	
Candidates were expected to calculate the experience rating modification factor. Specifically, candidates were expected to calculate the expected losses, expected primary losses, and expected excess losses and use them along with the other information provided to calculate the experience rating modification factor.	
Common errors included:	
<ul style="list-style-type: none">• Flipping the calculations for expected primary and excess loss.• Double counting actual and/or expected losses by including the total row in the calculation.• Trying to calculate the ISO GL experience mod using the information given.• Combining components of both the generic and alternative formulas in the calculation of the experience rating modification factor.• Miscalculating primary and/or excess credibility, or using the weighting value as credibility when using the generic formula.• Using the expected loss ratio, not the expected loss rate, to calculate expected losses.	
Part b	
Candidates were expected to calculate the retrospective premium using the information provided. Specifically, candidates were expected to calculate the basic premium, the retrospective premium, and the minimum & maximum retrospective premiums. Candidates were also expected to compare the retrospective premium to the calculated minimum and maximum for selecting their final retrospective premium.	
Common errors included:	
<ul style="list-style-type: none">• One or more errors when calculating the converted net insurance charge component of the basic premium. The most common error was missing the application of the expected loss ratio. Other errors included not applying the loss conversion factor and not subtracting the insurance savings from the insurance charge.• Adding instead of subtracting the expense provided through LCF in the basic premium calculation.• Not multiplying one or more components of the basic premium by the standard premium• Incorporating the experience modification factor from part a.• Using a value other than the given limited reported losses to calculate the converted losses used in the retrospective premium.• Not calculating the minimum & maximum premiums, which is needed to ensure that the final retrospective premium is within those bounds.	

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QUESTION 16	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE(S): B1, B2
EXAMINER'S REPORT	
Candidates were expected to know the definition of reported claims as well as how to aggregate claims by accident year as of different development periods.	
Part a	
Candidates were expected to aggregate paid claims by accident year as of different development periods.	
Common errors included:	
<ul style="list-style-type: none">• Calculating the development periods from the accident date of each claim rather than assuming the same basis for all claims (January-December). For example, claim B (accident date April 28, 2015) would be as of 12 months of development at December 31, 2015 and not April 28, 2016.• Including claim A, which does not fall in accident year 2015.	
Part b	
Candidates were expected to know the definition of reported claims as well as how to aggregate claims by accident year as of different development periods.	
Common errors included:	
<ul style="list-style-type: none">• Calculating the development periods from the accident date of each claim rather than assuming the same basis for all claims (January-December). For example, claim B (accident date April 28, 2015) would be as of 12 months of development at December 31, 2015 and not April 28, 2016.• Considering claim A, which does not fall in accident year 2015.• Not taking into account the outstanding amount from 2016 on claim B as no transaction occurred on this claim in 2017.• Incorrectly calculating the reported claims either by adding a variation of reserve to the cumulative paid claim or by adding a reserve as of a certain development period to the incremental paid claim.	

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QUESTION 17	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): B3
EXAMINER'S REPORT	
Candidates were expected to perform a Bornhuetter-Ferguson technique and know the conditions necessary for the technique to provide a suitable estimate of ultimate claims.	
Part a	
Candidates were expected to perform a Bornhuetter-Ferguson technique.	
Common errors included:	
<ul style="list-style-type: none">• Calculating ultimate claims but not the ultimate claim ratio.• Miscalculating the ultimate claim ratio as ultimate claims/reported claims.	
Part b	
Candidates were expected to interpret the results from part a. and note that there was an increasing claim ratio that was higher than the 70% used in the Bornhuetter-Ferguson technique, making the technique inappropriate.	
Common errors included:	
<ul style="list-style-type: none">• Stating that there was a change in case reserve adequacy, so the Bornhuetter-Ferguson technique was inappropriate and a Berquist-Sherman technique was necessary. There was no mention of claim counts in the problem, and the reported LDFs were stable, so there was no basis to definitively make this statement.• Stating that earned premium was growing, so the Bornhuetter-Ferguson technique was inappropriate without mentioning the deteriorating claims ratio.	

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QUESTION 18	
TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE(S): B3
EXAMINER'S REPORT	
Candidates were expected to apply a frequency-severity technique by developing claim counts and severities, applying trend, and accounting for changes due to tort reform	
Common errors for claim counts included:	
<ul style="list-style-type: none">• Applying age-to-age factors instead of age-to-ultimate factors.• Using average claim counts from prior years.	
Common errors for severities included:	
<ul style="list-style-type: none">• Using reported claims triangle factors instead of severity factors or backing into severity from ultimate claims and ultimate claim counts. Using this severity and multiplying back ultimate counts returns the reported development technique and is not actually a frequency severity technique.• Only developing a single year rather than all periods.	
Other common errors included:	
<ul style="list-style-type: none">• Applying trend factors in the triangles rather than to developed severities.• Not applying tort reform factors or applying them incorrectly.• Basing ultimate claims on calculations that were not frequency-severity or using undeveloped claim counts.	

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QUESTION 19	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): B3, B4, B5
EXAMINER’S REPORT	
Candidates were expected to briefly assess the appropriateness of two common techniques (paid development and reported Bornhuetter-Ferguson) for estimating ultimate claims under several scenarios. This required candidates to have knowledge of the mechanics of these two techniques, as well as how they react to changing conditions in the data being analyzed.	
Part a	
Candidates were expected to assess the impact of a large unexpected loss being paid early in the life of the accident year.	
Common errors included:	
<ul style="list-style-type: none"> • Stating that the Reported Bornhuetter-Ferguson (BF) technique overstated ultimates as a result of the shock loss, due to the concept of BF as a credibility-weighted average of development and expected claims techniques. • Discussing the paid BF technique rather than the paid development technique. 	
Part b	
Candidates were expected to assess the impact of an unreliable history of rate changes on the two techniques.	
Common errors included:	
<ul style="list-style-type: none"> • Simply stating the reported B-F technique does not involve on-level earned premium without supplying an alternate source of expected claims other than the historic data. • Assuming rate changes had an effect on paid claims development patterns. • Discussing the paid BF technique rather than the paid development technique. 	
Part c	
Candidates were expected to assess the impact of a speedup in claim settlement on the two techniques.	
Common errors included:	
<ul style="list-style-type: none"> • Asserting that the speedup in claim settlement would understate ultimate claims due to lowering development factors. • Asserting that the speedup in payment would have a distorting effect on reported development factors. 	
Part d	
Candidates were expected to assess the impact of an unexpectedly high severity trend on the two techniques.	
Common errors included:	
<ul style="list-style-type: none"> • Reversing the assessment of appropriateness, claiming that the development technique would overstate and the Bornhuetter-Ferguson would temper the overstatement. • Asserting that the paid triangle needed to be adjusted via Berquist-Sherman techniques. 	

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QUESTION 20	
TOTAL POINT VALUE: 1.25	LEARNING OBJECTIVE(S): B3, B4
EXAMINER'S REPORT	
Candidates were expected to assess how operating changes affect the estimation of unpaid claims, as well as demonstrate an understanding of the assumptions and mechanics of the reported claim and case outstanding development techniques.	
Part a	
Candidates were expected to understand how a change in case reserve practices would impact the reported claim and case outstanding development techniques.	
Common errors included:	
<ul style="list-style-type: none">• Stating that a technique was understated. The increase in case adequacy will overstate each technique.• Stating that a technique was distorted without providing evidence or commentary for why it was distorted.• Stating that a technique would properly respond to the case reserve changes if the technique was properly adjusted, where the question specifically states that no adjustments are made.	
Part b	
Candidates were expected to provide a technique that would not be impacted by the change in case reserve adequacy.	
Common errors included:	
<ul style="list-style-type: none">• Stating ambiguous technique descriptions, such as development technique or BF technique, where there are reported and paid options, but not specifically pointing out that the paid option is not impacted.	

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QUESTION 21	
TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE(S): B5
EXAMINER'S REPORT	
<p>Candidates were expected to perform a Berquist-Sherman adjustment, adjusting for both changes in rate of claims settlement and changes in case outstanding adequacy. Candidates were expected to calculate the adjusted average case outstanding triangle, adjusted closed and open claim count triangles, adjusted reported claims triangle, and finally ultimate loss & ALAE based on the adjusted reported claims triangle.</p> <p>The question did not provide an adjusted reported 48-ultimate development factor. Therefore, any assumption candidates made relating to the adjusted reported 48-ultimate factor was acceptable.</p> <p>Common errors included:</p> <ul style="list-style-type: none">• Using calendar year 2017 as the basis for adjusting, instead of 2016 as the problem stated.• Not adjusting open claims for changes in settlement rate before calculating the adjusted reported claims triangle.• Performing a development technique on the provided adjusted paid triangle.	

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EXAMINER'S REPORT**

QUESTION 22	
TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE(S): B3, B6
EXAMINER'S REPORT	
Candidates were expected to demonstrate knowledge in estimating ultimate claims using the development technique, application of quota share and stop loss reinsurance arrangements, and the impact reinsurance can have on claim development patterns.	
Part a	
Candidates were expected to develop claims to ultimate for each accident year given a reported claims triangle using the development technique, net of the described quota share and aggregate stop loss reinsurance treaties.	
Common errors included: <ul style="list-style-type: none">• Failing to apply either the quota share or stop loss reinsurance treaty.• Developing claims to ultimate using age-to-age factors rather than age-to-ultimate.• Not including the given tail factor within claim development calculations.• Calculating the estimated ultimate from the point of view of the reinsurer.	
Part b	
Candidates were expected to calculate ceded IBNR for accident year 2017.	
Common errors included: <ul style="list-style-type: none">• Calculating the ceded ultimate rather than ceded IBNR.• Only calculating the ceded IBNR for one of the reinsurance treaties.	
Part c	
Candidates were expected to demonstrate knowledge of how different reinsurance arrangements would impact claims development factors.	
Common errors included: <ul style="list-style-type: none">• Stating that the net tail factor will be greater than the gross tail factor in the presence of stop loss reinsurance, when the opposite is true.• For stop loss, stating that the net tail factor will equal 1.0. This is not appropriate since the net tail factor would only be 1.0 if claims are guaranteed to hit the stop loss attachment prior to the oldest maturity date in the reported claims triangle. Since claims may not hit the attachment point until maturities beyond that of the latest age in the triangle, a tail factor above 1.0 would be appropriate to reflect this. While the net tail factor will typically be smaller than the gross tail factor, stating that the net tail factor will always equal 1.0 is incorrect.• For stop loss, describing the expected impact to development of ceded claims from the perspective of the reinsurer, rather than expected impact to development of net claims from the perspective of the insurer.• Stating that the net tail factor in the presence of quota share reinsurance is obtained by adjusting the gross tail factor based on the percentage of claims being ceded under the treaty.• Vagueness in response, failing to clearly distinguish between gross and net.	

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QUESTION 23	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE: B7
EXAMINER’S REPORT	
Candidates were expected to estimate unpaid ULAE using the classical technique and Kittel refinement and provide a scenario that distorts the classical technique along with the details of how the Kittel refinement technique addresses the distortion.	
Part a	
Candidates were expected to calculate calendar year paid ULAE to paid claims ratios, calculate accident year IBNER and IBNYR, and estimate unpaid ULAE using the classical technique, including the selection and justification of a reasonable ULAE ratio.	
Common errors included:	
<ul style="list-style-type: none">• Calculating ratios that use a base other than paid claims.• Selecting a ratio that included calendar year 2014, an outlier within the four years, which fails to properly adjust for the change going forward.• Failing to justify the selected paid ULAE to paid claims ratio.• Failing to or incorrectly calculating IBNER and IBNYR.• Applying an assumption other than the classical 50/50 assumption.• Omitting case reserves, IBNER, or IBNYR from the unpaid calculation.• Failing to use the accident year 2017 reserve amounts given.• Failing to apply half of the ratio to the case reserves and IBNER.	
Part b	
Candidates were expected to apply the Kittel refinement by calculating ratios of calendar year paid ULAE to average paid and incurred claims and applying this ratio appropriately to case reserves, IBNER, and IBNYR.	
Common errors included:	
<ul style="list-style-type: none">• Calculating ratios that use a base of incurred claims only.• Calculating ratios that use a base of paid claims only.• Applying an assumption other than the classical 50/50 assumption.• Omitting case reserves, IBNER, or IBNYR from the unpaid calculation.• Failing to use the AY 2017 reserve amounts given.• Failing to apply half of the ratio to the case reserves and IBNER.	
Part c	
Candidates were expected to identify one scenario that distorts the classical technique and explain how the Kittel refinement technique addresses the distortion.	
Common Classical distortion scenario errors included:	
<ul style="list-style-type: none">• Failing to identify a scenario in which the ULAE/claims relationship could clearly change over time.	
Common Kittel adjustment errors included:	
<ul style="list-style-type: none">• Stating that the Kittel technique uses incurred claims only.• Simply stating that the Kittel technique adjusts for the distortion without providing an explanation.	

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EXAMINER’S REPORT**

QUESTION 24	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE(S): B8
EXAMINER’S REPORT	
Candidates were expected to calculate actual reported claims between two dates and understand the relation between chain ladder development factors and reporting patterns in order to calculate the expected claims emergence between. They were also expected to compare the actual emergence to the expected emergence and give reasons why the actual emergence may deviate from the expected emergence.	
Part a	
Candidates were expected to compute the actual and expected claims reported in the given time period and compare the two, either numerically or descriptively.	
Common errors included: <ul style="list-style-type: none">• Not realizing that the given development factors were semi-annual and applying them as annual factors when calculating the expected emergence.• Using the age-to-age factors as age-to-ultimate factors.• Calculating cumulative expected claims instead of incremental expected claims in the given time period.	
Part b	
Candidates were expected to provide two reasons that would result in reported claims emerging lower than expected and to explain their reasoning.	
Common errors included: <ul style="list-style-type: none">• Simply stating “change in mix of business” without additional explanation. An appropriate answer would have been: a change in the mix of business towards a longer tailed line of business leading to claims being reported later than expected.• Restating the question as an answer: “claims coming in lower”.• Confusing reported claims emerging lower than expected and claims emerging higher than expected.	
Part c	
Candidates were expected to provide two reasons that would result in reported claims emerging higher than expected and to explain their reasoning.	
Common errors included: <ul style="list-style-type: none">• Simply stating “change in mix of business” without additional explanation. An appropriate answer would have been: a change in the mix of business towards a shorter tailed line of business leading to claims being reported faster than expected.• Making statements about paid claims and the case reserves without considering the fact that the two are linked.• Confusing reported claims emerging lower than expected and claims emerging higher than expected.	

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EXAMINER'S REPORT**

QUESTION 25	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE(S): B7, B8
EXAMINER'S REPORT	
Candidates were expected to demonstrate knowledge of the paid development technique on ALAE, the development technique using ratio of paid ALAE to paid claims with additive factors, and when each technique works and when it does not.	
Part a	
Candidates were expected to apply the paid development technique to estimate ultimate ALAE for the latest accident year.	
A common error was calculating development factors based on paid claims or paid to paid triangles rather than the paid ALAE triangle	
Part b	
Candidates were expected to use the development technique using a ratio of paid ALAE to paid claims with additive factors to estimate ultimate ALAE for all accident years.	
Common errors included:	
<ul style="list-style-type: none">• Using multiplicative factors instead of additive factors.• Using paid claims or paid ALAE for development instead of the paid to paid ratio.• Calculating ultimate ALAE for only the latest accident year instead of all years.	
Part c	
Candidates were expected to select an estimate of ultimate ALAE and justify their selection by noting a weakness in the technique not selected or a strength of the technique selected. These can be general weaknesses/strengths or weakness/strengths applicable to the data for this specific scenario.	
Common errors included incomplete or insufficient explanations such as:	
<ul style="list-style-type: none">• Simply selecting a number with no explanation.• Ignoring the specific information in the question.• Stating that a method is over or understated without describing why or providing an explanation that would have caused it to move in the opposite direction.	

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EXAMINER'S REPORT**

QUESTION 26	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE(S): B2, B5, B8
EXAMINER'S REPORT	
Candidates were expected to analyze various claim projection results in order to identify operational changes. Candidates were expected to provide diagnostics which could support operational changes.	
Part a	
Candidates were expected to discuss how increasing case reserve adequacy would cause the increases seen in the reported development and reported Bornhuetter-Ferguson (BF) techniques that was corrected in the reported Berquist-Sherman (BS) technique.	
Common errors included:	
<ul style="list-style-type: none">• Naming an operational change but not providing any support from the technique projections provided in the question.• Identifying a change in payment pattern. A change in payment pattern is not supported since the paid development, paid BF, and paid BS techniques all have similar results.	
Part b	
Candidates were expected to identify two diagnostics that could be used to demonstrate the presence of the operational change identified in part a.	
Common errors included:	
<ul style="list-style-type: none">• Stating a diagnostic but failing to describe how the diagnostic shows evidence for the operational change.• Identifying diagnostics that did not relate to the identified operational change or incorrectly relating the results to the operational change.	
Part c	
Candidates were expected to understand the relationship between the paid claims development and paid Berquist-Sherman techniques.	
Common errors included:	
<ul style="list-style-type: none">• Incorrectly defining disposal rate as closed claim counts / reported claim counts• Some candidates cited the paid-to-reported triangle, but in this case looking at this diagnostic would not show consistency, as there are changes in case reserve adequacy.	