20. (3 points)

Given the following information about an insurance company's workers compensation book of business as of December 31, 2016:

Accident Year	Payroll ($00)	Reported Claims ($000)	Indicated Ultimate Claim Counts	Selected Ultimate Severity
2013	306,000	15,450	2,300	7,000
2014	313,000	17,000	2,400	7,500
2015	318,000	14,625	2,500	not provided
2016	325,000	11,000	not provided	not provided

- Annual inflation rate for payroll = 2%.
- Annual claim count trend = 1%.
- Annual severity trend = 8%.
- The cumulative reported claims development factor at 12 months = 1.8.

a. (1.75 points)

Select and briefly justify an ultimate frequency estimate for accident year 2016.

b. (0.5 point)

Select an appropriate ultimate severity estimate for accident year 2016.

c. (0.75 point)

Calculate accident year 2016 ultimate claims using a Bornhuetter-Ferguson technique that blends the reported development technique with the frequency-severity technique.

CONTINUED ON NEXT PAGE

QUESTION 20	
TOTAL POINT VALUE: 3	**LEARNING OBJECTIVE(S): B3**
SAMPLE ANSWERS	
Part a: 1.75 points	

Sample 1

Trend Period
2013 – 3 years of trend, 2014 – 2 years of trend, and 2015 – 1 year of trend

Trend Payroll
2013: 1.02^3 x 306,000 = 324,730
2014: 1.02^2 x 313,000 = 325,645
2015: 1.02^1 x 318,000 = 324,360

Trend Claim Counts
2013: 1.01^3 x 2,300 = 2,370
2014: 1.01^2 x 2,400 = 2,448
2015: 1.01^1 x 2,500 = 2,525

Divide Trended Claim Counts by Trended Payroll
2013: 2,370 / 324,730 = 0.0073%
2014: 2,448 / 325,645 = 0.0075%
2015: 2,525 / 324,360 = 0.0078%

Select .0078%: there is an increasing trend so select most recent to be responsive to increasing frequency.

Sample 2

AY	Payroll Trend	Claim count Trend	Trended Freq (CC/payroll)*(CC trend/payroll trend)
2013	$(1.02)^3$	$(1.01)^3$	.000073
2014	$(1.02)^2$	$(1.01)^2$	.000075
2015	(1.02)	(1.01)	.000078

Since there is increase in frequency, I select average of last 2 years to respond to the change.
Select .0000765

Sample 3

AY	Claim Count	Count Trend	Payroll	Payroll trend	Freq Ult and trended
13	2300	1.01^3	306000	1.02^3	.0000730
14	2400	1.01^2	313000	1.02^2	.0000752
15	2500	1.01^1	318000	1.02^1	.0000778

I would select a 3 year average (.00753%): although the frequency appears to be slightly increasing, 3 years of data is not enough to make a judgment so I will average all 3 years.

Part b: 0.5 point

Trend Severity and make selection
2013: 7,000 x 1.08^3 = 8,818
2014: 7,500 x 1.08^2 = 8,748

Take two-year average: 8,783

Part c: 0.75 point

Calculate Frequency – Severity Ultimate using selections from parts a & b

2016 Payroll x Frequency Selections x Severity
325,000 x 0.00765 x 8,783 = 22,264,905

Calculate B-F Ultimate using actual reported , and F-S ultimate x % unreported

11,000,000 + (1 – 1/1.8) x 22,264,905 = 20,895,513.33

EXAMINER'S REPORT

Candidates were expected to demonstrate knowledge of the Frequency – Severity technique, which includes the correct calculation of frequency using trended counts and a trended exposure base. Candidates were expected to know the correct trend periods, and then trend counts, exposures and severities to the correct time period. Lastly, the candidate needed to show they could correctly apply the B-F approach using actual reported, and the amount unreported using the F-S ultimate and the percentage unreported, which was calculated using the 12 month-to-Ultimate LDF.

Part a

Candidates were expected to trend payrolls and claim counts for each accident year to 2016 level using the inflation percentages provided in the question. The candidates were also expected to calculate the frequencies for each year using the trended counts divided by trended payroll, and identify the increasing frequency trend. Lastly, candidates were expected to select a frequency trend and provide some justification for the selection.

Common errors included:

- Not justifying the frequency selection
- Attempting to calculate/justify the given trend percentages vs. using the given information to calculate frequency
- Not trending the claim counts and/or payroll

Part b

Candidates were expected to trend the 2013 and 2014 ultimate severity selections to 2016, and then take an average for the severity selection.

Common errors included:

- Only using one year for selection vs. both years
    - Candidates were expected to use both years since one year is not sufficient for a severity selection
- Attempting to calculate severities for other years where ultimate severity selections were not given in the question.
    - There was not enough information to calculate the 2015 ultimate severity
- Using the 12-to-ultimate LDF to calculate an estimate for the 2016 severity
    - Using this LDF and estimated ultimate claims from part (a) was not accepted, as the severity selection should be done separate from and not using the selected frequency.

Part c

Candidates were expected to use their answers from part a and b to calculate the F-S ultimate for accident year 2016, using the 2016 exposure base (payroll). Candidates were then expected to apply the B-F method by multiplying the F-S ultimate by the % unreported using the LDF given in the question, and then add on the actual reported.

Common errors included:

- Incorrectly calculating the frequency severity ultimate, where the most common mistake was not using the correct units, e.g. converting reported in to thousands, or incorrectly converting payroll from the question
- Incorrect application of the B-F approach, e.g. incorrectly calculating the percent unreported using the LDF, or applying the percent reported to the F-S ultimate