14. (4.75 points)

The following information is available for a federally regulated property and casualty insurance company as at December 31, 2018. The company writes only personal property insurance. All amounts are in thousands of dollars ($000s).

From Annual Return page 80.10 – Commissions:

		Commissions in respect of premiums written						
A. Deferred Commissions at Beginning of Year	B. Unearned Commissions at Beginning of Year	C. Direct	D. Reinsurance assumed	E. Reinsurance Ceded	F. Net	G. Deferred Commissions end of year	H. Unearned Commissions end of year	I. Net Commissions attributable to the period
?	2,200	18,000	0	?	?	?	2,500	17,100

Other financial information from page 80.10:

J. Gross contingent commissions	500
K. Ceded contingent commissions	250
L. Gross other non-deferrable commissions	300
M. Ceded other non-deferrable commissions	100
N. Ceded commission income	600

Other information:

O. Direct unearned premium	120,000
P. Assumed unearned premium	0
Q. Ceded unearned premium	6,000
R. Expected reinsurance premium	5,000
S. Selected undiscounted loss ratio (excl. ULAE)	88.00%
T. Selected ULAE ratio	5.00%
U. Discount rate	3.50%
V. Margin for adverse deviations (MfAD) for claims development	7.00%
W. MfAD for recovery from reinsurance ceded	2.00%
X. MfAD for investment return rates	0.75%
Y. Maintenance expense ratio (% gross premium)	3.50%
Z. Contingent commission rate (% gross premium)	0.00%

Note: Candidates may use the letters A to Z in the formulas in their solutions.

<< QUESTION 14 CONTINUED ON NEXT PAGE >>

The cumulative accident year payment pattern is as follows:

Age (Months)	% Cumulative Paid
12	60%
24	90%
36	100%

a. (1.25 points)

Calculate the total net commissions as they appear on the Annual Return page 80.10.

b. (3.5 points)

Calculate the premium deficiency, if any.

CONTINUED ON NEXT PAGE

QUESTION 14	
TOTAL POINT VALUE: 4.75	**LEARNING OBJECTIVE(S): C1**
SAMPLE ANSWERS	
Part a: 1.25 points	

Sample 1

Ceded Commission Income = Unearned Commission at Beginning – Unearned Commission at End + Ceded Commissions
600 = 2200 – 2500 + Ceded Commissions
Ceded Commissions = 900

Net Commissions Attributable to the period = Deferred Commissions at Beginning – Deferred Commissions at End + Direct Commissions + Assumed Commissions – (Unearned Commissions at Beginning - Unearned Commissions at End + Ceded Commissions)
17,100 = Deferred Commissions at Beginning – Deferred Commissions at End + 18,000 + 0 – (2200 – 2500 + 900)
Deferred Commissions at Beginning – Deferred Commissions at End = -300

Gross Commission Expense = Deferred Commissions at Beginning – Deferred Commissions at End + Direct Commissions + Assumed Commissions
= -300 + 18,000 + 0
= 17,700

Total Gross Commission = Gross Commission Expense + Gross Contingent Commission + Gross other non-deferable commissions
= 17,700 + 500 + 300
= 18,500

Total Ceded Commission = Ceded Commission Income + Ceded Contingent Commission + Ceded other non-deferable commissions
= 600 + 250 +100
= 950

Total Net Commissions = 18,500 – 950 = 17,550

Sample 2

N = B – H + E
E = 900

I = Deferred Commissions at Beginning – Deferred Commissions at End + C + D – (B – H + E)
Deferred Commissions at Beginning – Deferred Commissions at End = -300

Gross Commission Expense = Deferred Commissions at Beginning – Deferred Commissions at End + C + D
= -300 + 18,000 + 0
= 17,700

Total Gross Commission = Gross Commission Expense + J + L
= 17,700 + 500 + 300
= 18,500

Total Ceded Commission = N + K + M
= 600 + 250 +100
= 950

Total Net Commissions = 18,500 – 950 = 17,550

Sample 3
Total Net Commissions = Total Gross Commission - Total Ceded Commission

Net Commissions Attributable to the period = Gross Commission Expense – Ceded Commission Income
17,100 = Gross Commission Expense – 600
Gross Commission Expense = 17,700

Total Gross Commission = 17,700 + 500 + 300
= 18,500

Total Ceded Commission = 600 + 250 +100
= 950

Total Net Commissions = 18,500 – 950 = 17,550

Sample 4
Total Net Commissions = Total Gross Commission - Total Ceded Commission

I = Gross Commission Expense – Ceded Commission Income
17,100 = Gross Commission Expense – 600
Gross Commission Expense = 17,700

Total Gross Commission = 17,700 + J + L
= 18,500

Total Ceded Commission = N + K + M
= 950

Total Net Commissions = 18,500 – 950 = 17,550

Sample 5
Total Net Commissions = Net Commissions attributable to the period + Net Contingent Commissions + Net Other Non-Deferrable Commissions
= 17,100 + (500 – 250) + (300 – 100)

= 17,500

Sample 6
Total Net Commissions = I + (J - K) + (L - M)
= 17,550

Part b: 3.5 points

Sample 1
Assumed ULAE ratio is a % of Premiums → ULAE = 5.00% * 120,000 = 6,000
ULAE = T * O = 6,000

Net Undiscounted Losses = (Net Unearned Premium – Future Reinsurance Cost) *ELR + ULAE
= [(O – Q) – R] * S + 6,000
= [(120,000 – 6,000) – 5,000] * 88% + 6,000
= 101,920

t	PV@3.5%	PV@2.75%
0.5	60% * 1.035^-0.5	60% * 1.0275^-0.5
1.5	30% * 1.035^-1.5	30% * 1.0275^-1.5
2.5	10% * 1.035^-2.5	10% * 1.0275^-2.5
	Sum = 0.966	Sum = 0.973

Adjustment for average accident date
Adj PV @ 3.5% = 0.966 * 1.035^(1/2 – 1/3) = 0.972
Adj PV @ 2.75% = 0.973 * 1.0275^(1/2 – 1/3) = 0.978

Net PV = 101,920 * 0.972 = 99,066
Gross PV = (120,000 * 88% + 6,000) * 0.972 = 108,475
Ceded PV = 108,475 – 99,066 = 9,409

Net APV = 101,920 * 0.978 + 99,066 * 7.00% + 9,409 * 2.00%
= 106,781

Maintenance Expense = O * Y = 120,000 * 3.5% = 4,200

Premium Liabilities = Net APV + Expected Reinsurance Premium + Maintenance Expense + Contingent Commission
= 106,781 + 5,000 + 4,200 + 0
= 115,981

Gross Unearned Commissions = H = 2,500

Equity in Unearned Premium = Net UPR – Premium Liabilities + Gross Unearned Commissions
= 114,000 – 115,981 + 2,500
= 519

Since the max DPAE > 0, the premium deficiency is 0.

Sample 2
Net Unearned Premium = O + P – Q = 120,000 + 0 – 6,000 = 114,000
Gross Unearned Premium = O + P = 120,000 + 0 = 120,000

Assumed ULAE ratio is a % of Losses → ULAE = 5.00% * 120,000 * 88% = 5,280
ULAE = T * O * S = 6,000

Net Undiscounted Losses & LAE = (114,000 – R) * S + 5,280
= (114,000 – 5,000) * 88% + 5,280
= 101,200

Gross Undiscounted Losses & LAE = 120,000 * 88% + 5,280 = 110,880

PV factor @ 3.5% = [0.60/(1.035^0.5) + 0.30/(1.035^1.5) + 0.10/(1.035^2.5)] * 1.035^(0.5-1/3)
= 0.9720

PV factor @ 2.75% = [0.60/(1.0275^0.5) + 0.30/(1.0275^1.5) + 0.10/(1.0275^2.5)] * 1.0275^(0.5-1/3)
= 0.9778

Net PV @ 3.5% = 101,200 * 0.9720 = 98,366
Net PV @ 2.75% = 101,200 * 0.9778 = 98,954
Gross PV @ 3.5% = 110,880 * 0.972 = 107,775
Ceded PV @ 3.5% = 107,775 – 98,366 = 9,409

Claims Development PFAD = 98,366 * V = 98,366 * 7.00% = 6,886
Interest Rate PFAD = 98,954 – 98,366 = 588
Reinsurance PFAD = 9,409 * W = 9,409 * 2.00% = 188

Net APV = 98,366 + 6,886 + 588 + 188 = 106,028

Maintenance Expense = O * Y = 120,000 * 3.5% = 4,200

Premium Liabilities = Net APV + Expected Reinsurance Premium + Maintenance Expense + Contingent Commission
= 106,028 + 5,000 + 4,200 + 0
= 115,228

Gross Unearned Commissions = H = 2,500

Equity in Unearned Premium = Net UPR – Premium Liabilities + Gross Unearned Commissions
= 114,000 – 115,228 + 2,500
= 1,272

Since the max DPAE > 0, the premium deficiency is 0.

EXAMINER'S REPORT

Candidates were expected to know the components of total net commissions and be able to determine whether a premium deficiency exists.

Part a

Candidates were expected to understand how to derive the total net commissions using the components from page 80.10 of the P&C Return.

Common mistakes included:

- Not knowing the formula for gross commission expense

Part b

Candidates were expected determine the premium deficiency, or the maximum allowable DPAE, given all the components and assumptions that would normally be available to the actuary when performing the calculation.

Credit was given to candidates when a mistake in calculation led to a negative equity in unearned premium if they indicated this would be a premium deficiency.

Common errors included:

- Assuming the ULAE ratio is applied to both gross and net losses or gross and net premiums, which meant a ceded ULAE > 0. Since this is very uncommon in practice, credit was only given if it was clearly stated that ULAE is assumed to be ceded as part of the reinsurance contract.
- Excluding the expected reinsurance premium when determining ceded losses, either by deducting it from gross unearned premiums, or by calculating ceded losses directly from ceded unearned premiums without adding the expected reinsurance premium.
- Determining the reinsurance PfAD as a percent of the expected reinsurance premium.
- Using gross unearned premiums to calculate equity in unearned premiums, instead of net unearned premiums.
- Not adding gross unearned commissions to the equity in unearned premium.
- Using a commission other than gross unearned commissions in the equity in unearned premium calculation.