16. (4.75 points)

The following information is available for a property and casualty insurance company's P&C-1. All amounts are in thousands of dollars ($000s).

Page 20.10 Asset	**2017**	**2016**
Recoverable from Reinsurers		
Unearned Premiums	n/a	1,200
Unpaid Claims and Adjustment Expenses	**A**	1,760
Total Investments including cash	30,000	25,000

Page 20.20 Liabilities and Equity	**2017**	**2016**
Unearned Premiums	**J**	3,000
Unpaid Claims and Adjustment Expenses	**B**	4,477

Page 20.30 Statement of Income	**2017**	**2016**
Net Premium Written	16,000	15,000
Net Premium Earned	15,800	n/a
Gross Claims and Adjustment Expenses	**C**	n/a
Reinsurers' share of claims and adjustment expenses	**D**	n/a
Net Claims and Adjustment Expenses	**E**	n/a
Net Investment Income	1,800	n/a

Page 60.41 Net Claims and Adjustment Expenses Run-Off - Discounted		**2016**	**2017**	**2017 & prior**
2016	UCAE, end of year	1,200		
	IBNR, end of year	1,517		
2017	Paid during year	**F**	n/a	n/a
	UCAE, end of year	900	n/a	2,100
	IBNR, end of year	1,159	n/a	**K**
	Investment Income from UCAE & IBNR	**G**		
	Amount: excess (deficiency)	n/a		
	Ratio: excess (deficiency)	**H**		

Payment Pattern	
Year 1	20%
Year 2	30%
Year 3	50%

<< QUESTION 16 CONTINUED ON NEXT PAGE >>

Cumulative Paid Losses

Accident Year	Development Month 12	24
2016	1,000	3,000
2017	1,000	

Undiscounted Unpaid

Accident Year	Development Month 12	24
2016	n/a	3,000
2017	4,000	

- The company purchases quota share reinsurance. The percentage retained by the company is 60%.
- Claims development margin for adverse deviation (MfAD): 15%
- Reinsurance recovery MfAD: 2%
- Investment return MfAD: 0.75%

Bond Portfolio

Rating	Classification	Book Value	Market Value	Duration	Yield
Government	Held to Maturity	2,000	1,000	0.8	1.0%
AAA	Held to Maturity	8,000	8,000	10.0	2.0%
A	Held to Maturity	15,000	17,000	3.0	3.0%
Common Shares			5,000		10.0%

Calculate A, B, C, D, E, F, G, H, J, and K. (Note that there is no letter I.)

CONTINUED ON NEXT PAGE

QUESTION 16

TOTAL POINT VALUE: 4.75 | **LEARNING OBJECTIVE(S): C1**

SAMPLE ANSWERS

Weight yield of bonds by duration and book value (since bonds are held to maturity):
Discount rate = (2000 × 0.8 × 1% + 8000 × 10 × 2% + 15000 × 3 × 3%) / (2000 × 0.8 + 8000 × 10 + 15000 × 3) = 2.34%

Payment pattern:

Accident Year	t = 0.5	t = 1.5
2016	3000 × 50% / (100%-50%) = 3000	0
2017	4000 × 30% / (100%-20%) = 1500	4000 × 50% / (100%-20%) = 2500
Total	4500	2500

Present value factors at 2.34% discount rate:
PVF at t=0.5 = $1.0234^{-0.5}$ = 0.9885
PVF at t=1.5 = $1.0234^{-1.5}$ = 0.9659

Discount rate with investment return MfAD = 2.34% - 0.75% = 1.59%
Present value factors at 1.59% discount rate:
PVF at t=0.5 = $1.0159^{-0.5}$ = 0.9921
PVF at t=1.5 = $1.0159^{-1.5}$ = 0.9766

Gross discounted liabilities at 2.34% = 4500 × 0.9885 + 2500 × 0.9659 = 6863.00
Gross discounted liabilities at 1.59% = 4500 × 0.9921 + 2500 × 0.9766 = 6906.18

Net discounted liabilities at 2.34% = 6863 × 60% = 4117.8

Claims PfAD = 6863 × 15% = 1029.45
Interest rate PfAD = 6906.18 – 6863 = 43.18
Reinsurance PfAD = 6863 × (1-60%) × 2% = 54.90

Gross AAP Liabilities = 6863.00 + 1029.45 + 43.18 = 7935.64
Ceded AAP Liabilities = 7935.64 × (1-60%) – 54.90 = 3119.35
Net AAP Liabilities = 7935.64 – 3119.35 = 4816.29

[A] = 3119.35
[B] = 7935.64
[C] = [B] – 2016 Gross UCAE + Gross paid during 2017 = 7935.64 – 4477 + (3000-1000) + 1000 = 6458.85
[D] = [A] – 2016 Recoverable UCAE + Ceded paid during 2017 = 3119.35 – 1760 + (1-60%) × (3000-1000+1000) = 2559.46
[E] = [C] – [D] = 3899.39
[F] = Net paid during 2017 for AY2016 = (3000-1000) × 60% = 1200

Investment yield = NII / (Beginning Total Inv + Ending Total Inv – NII) × 2 = 1800 / (25000+30000-1800) × 2 = 6.77%
[G] = 6.77% * [Average of 2016 Net (UCAE+IBNR) and 2017 Net (UCAE+IBNR)] = 6.77% × (1200+1517+900+1159)/2 = 161.59

Excess/Deficiency = 2016 Net (UCAE+IBNR) + [G] – [F] – 2017 Net (UCAE+IBNR) = 1200+1517 + 161.59 – 1200 – (900+1159) = -380.62
[H] = -380.62 / 2016 Net (UCAE+IBNR) = -380.62 / (1200+1517) = -14%

NEP = NWP – (2017 Net UEP – 2016 Net UEP)
15800 = 16000 – (2017 Net UEP – (3000-1200))
2017 Net UEP = 2000
[J] = 2000 / 60% = 3333.33

[K] = 2017 Net AAP Liabilities – 2017 Net UCAE = 4816.29 – 2100 = 2716.29

EXAMINER'S REPORT

Candidates were expected to understand the relationship across various P&C Return pages and the underlying calculations.

We note that the sample solution presented above assumes that payments are made mid-year. Solutions assuming year-end payments were also accepted.

The sample solution also assumes that the paid and unpaid triangles are gross of reinsurance. Solutions assuming triangles are net of reinsurance were also accepted, as long as the assumption is consistent throughout the response.

Common errors included:

- Using market value to calculate the discount rate
- Applying an incorrect payment pattern
- Incorrectly providing net APV and net unearned premium for B and J instead of gross values
- Not subtracting the unpaid claims and adjustment expenses as of December 31, 2016 from the calculation of C, D and E
- Providing the gross instead of net paid amount for F
- Using the discount rate instead of calculating a separate investment yield for the calculation of G
- Not subtracting IBNR as of December 31, 2017 in the calculation of K