13. (5.75 points)

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

	Capital (Margin) Required at Target
Insurance Risk Margin	
Premium liabilities	?
Unpaid claims	?
Catastrophes	0
Margin required for reinsurance ceded to unregistered reinsurers	0
Market Risk Margin	
Interest rate risk	?
Foreign exchange risk	400
Equity risk	11,000
Real estate risk	0
Other market risk exposures	0
Credit Risk Margin	3,100
Operational Risk Margin	?

Unpaid Claims Margin

Undiscounted unpaid claims - Accident year 2018	100,000
Undiscounted unpaid claims - Accident year 2017	0
Margin for adverse deviations (MfAD) for claims development	12%
Discount rate	3%
MfAD for investment return rates	0.5%
Risk factor for unpaid claims	10%

Premium Liabilities Margin

Net premium liabilities, discounted including Provisions for Adverse Deviations (PfAD)	80,000
Net premium liabilities, discounted excluding PfAD	78,000
Net premium liabilities duration	1.80
Risk factor for premium liabilities	15%

Assets

Bond portfolio market value	128,000
Bond portfolio modified duration	3.1
Risk factor for interest rate risk	1.25%

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Operational Risk Margin	Value	Risk Factor
Direct written premium in 2018	150,000	2.5%
Direct written premium in 2017	100,000	n/a
Reinsurance premium ceded in 2018	4,500	2.5%
Risk factor for premium growth beyond 20% threshold	n/a	2.5%
Risk factor applied to total capital required (before the operational risk margin and diversification credit) for the calculation of the operational risk margin	n/a	8.5%
Correlation factor between asset risk margin and insurance risk margin	n/a	50%

Capital Available	82,000

The cumulative accident year claim payment pattern is as follows:

Age (Months)	% Paid
12	25%
24	50%
36	75%
48	100%

The company began operations in 2017.

Calculate the Minimum Capital Test (MCT) ratio.

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QUESTION 13	
TOTAL POINT VALUE: 5.75	**LEARNING OBJECTIVE(S): C2**
SAMPLE ANSWERS	

Sample:

Time	Payment	PV@3%	PV@2.5%
.5	100000*1/3=33333.33	32844	32924
1.5	33333.33	31887	32121
2.5	33333.33	30959	31338
Total	**100000**	**95690**	**96383**

APV = 96383+95690*12%=107866

Mac Duration = (32844*.5+31887*1.5+30959*2.5)/95690 = 1.4803

Modified Duration = 1.4803/1.03 = 1.4372

Unpaid Claims Margin = 95690*10% = 9569

Premium Liabilities Margin = Max((150000-4500)*.3,78000)*15% = 11700

Assuming "Net premium liabilities duration" is the modified duration.

Interest Rate Risk Margin = 1.25%*|128000*3.1-(107866*1.4372+80000*1.8)| = 1222

Insurance Risk Margin = 9569+11700 = 21269

Market Risk Margin = 1222+400+11000=12622

Operational Risk Margin Cap = 30%*(21269+12622+3100)=11097.3

Operational Risk Margin =

150000*2.5%+4500*2.5%+(150000-100000*1.2)*2.5%+(21269+12622+3100)*8.5% = 7757

(less than cap)

I = 21269 A=12622+3100=15722

Div Credit = I+A-SQRT(I^2+A^2+2*.5*I*A) = 4836

Total Margin Required = 21269+15722+7757-4836 = 39912

MCT = 82000/(39912/1.5) = 308.2%

Alternate premium liabilities duration calculations

- Assuming the "Net premium liabilities duration is the Macauley duration
  Modified duration = Macauley duration / 1.03 = 1.80 / 1.03 = 1.748

EXAMINER'S REPORT

Using the information provided, candidates were expected to determine the total capital required to calculate the MCT ratio. Candidates were expected to calculate the margins required for unpaid claims, premium liabilities, and market risk. In addition, candidates were expected to calculate the capital required for operational risk and the diversification credit.

Common errors included:

- Calculation errors
- Using an incorrect payment pattern
- Miscalculating the claims development PfAD
  - Using a discount rate of 2.5%
  - Using an incorrect MfAD percentage

- Using an incorrect formula in calculating the discounted with PfAD amount
- Not using modified duration when calculating the duration
- In the interest risk formula
  - Using incorrect values
  - Not mentioning the absolute value component of the formula
- In the net premium liabilities margin calculation
  - Not excluding PfAD from the premium liabilities amount
  - Not considering the maximum between 30% of net written premiums and net premium liabilities
  - Using direct written premium instead of net written premiums in calculating the maximum
- Omitting components or calculation errors in the operational risk calculation
- Not dividing by 1.5 in final MCT calculation