14. (4.75 points)

The following information is available for the valuation of the premium liabilities as at December 31, 2018. All amounts are in thousands of dollars ($000s).

Net written premium in the last 12 months	100,000
Gross unearned premium	65,000
Net unearned premium	55,000
Selected general expense ratio	28%
Portion of expenses related to policy servicing cost	25%
Expected reinsurance premium	4,000
Gross present value losses and loss adjustment expenses (LAE)	51,900
Projected net undiscounted loss ratio including LAE	80%
Discount rate	3%
MfAD for claims development	6%
MfAD for recovery from reinsurance ceded	0.5%
MfAD for investment return rates	0.25%
Contingent commission	2,000
Unearned commission	2,700
MCT risk factor for premium liabilities	15%
Initial Deferred Policy Acquisition Expense (DPAE)	6,500

The cumulative accident year claim payment pattern is as follows:

Age (Months)	% Paid
12	40%
24	100%

a. (2.5 points)

Calculate the net premium liabilities as at December 31, 2018.

b. (0.5 point)

Determine whether the initial DPAE should be reduced.

c. (0.75 point)

Fully explain the impact on the return on equity (ROE) of a reduction of the initial DPAE.

d. (0.5 point)

Identify two different evaluation methods on which the projected loss ratios underlying the premium liabilities can be based.

e. (0.5 point)

Calculate the capital required at target for premium liabilities in the MCT.

QUESTION 14	
TOTAL POINT VALUE: 4.75	**LEARNING OBJECTIVE(S): C1-C2**
SAMPLE ANSWERS	
Part a: 2.5 points	

Sample 1

Adjusted net unearned premium = 55,000 – 4,000 = 51,000

Undiscounted losses and LAE = 51,000 x 80% = 40,800

PV(loss+LAE)@3% = 40,800 x (0.6 x $1.03^{-0.5}$ + 0.4 x $1.03^{-1.5}$) x $1.03^{(0.5-1/3)}$ = 39,694

PV(loss+LAE)@2.75% = 40,800 x (0.6 x $1.0275^{-0.5}$ + 0.4 x $1.0275^{-1.5}$) x $1.0275^{(0.5-1/3)}$ = 39,783

Claims PfAD = 39,694 x 6% = 2,382

Interest rate PfAD = 39,783 – 39,694 = 89

Reinsurance ceded PfAD = (51,900 – 39,694) x 0.5% = 61

APV = 39,694 + 2,382 + 89 + 61 = 42,226

Maintenance expenses = 65,000 x 28% x 25% = 4,550

Premium liabilities = APV + Maintenance expenses + Future reinsurance cost + Contingent commission

= 42,226 + 4,550 + 4,000 + 2,000 = 52,776

Sample 2

Undiscounted losses and LAE = (55,000 – 4,000) x 80% = 40,800

Discount factor @3% = (0.6 x $1.03^{-0.5}$ + 0.4 x $1.03^{-1.5}$) x $1.03^{(0.5-1/3)}$ = 0.9729

Discount factor @2.75% = (0.6 x $1.0275^{-0.5}$ + 0.4 x $1.0275^{-1.5}$) x $1.0275^{(0.5-1/3)}$ = 0.9751

APV = 40,800 x 0.9751 + 40,800 x 0.9729 x 0.06 + (51,900 − 40,800 x 0.9729) x 0.005 = 42,226

Premium liabilities = APV + Maintenance expenses + Future reinsurance cost + Contingent commission

= 42,226 + 65,000 x 0.28 x 0.25 + 4,000 + 2,000 = 52,776

Part b: 0.5 point

Equity in UPR = Net UPR + Unearned commission −Premium liabilities

= 55,000 + 2,700 − 52,776 = 4,924

Max DPAE = 4,924

Since initial DPAE (6,500) is greater than Max DPAE, the DPAE must be reduced.

Part c: 0.75 point

Sample 1

ROE = Net income / Equity

When DPAE is reduced 2 things occur:

- Equity is reduced because DPAE is held as an asset.
  EQ = A − L. If Assets decrease, Equity decreases
  This makes ROE go up
- As DPAE goes down, expenses increase on the income statement which reduces net income
  This makes ROE go down

The overall effect is uncertain.

Sample 2

The reduction in DPAE means that more of the premium acquisition expense must be recognized in the period. Therefore NI goes down. DPAE is categorized as asset. Thus, reducing asset will reduce equity by a similar amount then the NI reduction. Net effect would be a decrease in ROE.

Part d: 0.5 point

Sample responses (any two of the following)

- Valuation of claims liabilities
- Business plan analysis
- Ratemaking analysis
- Ad hoc analysis
- Deterministic method
- Stochastic method
- Historical loss ratio
- Industry benchmark
- Expert judgement

Part e: 0.5 point

Sample 1

Margin for Premium liabilities = Max(Premium liabilities excluding PfAD, 30% x NWP) x 15%

= Max(52,776 – 2,382 – 89 – 61, 30% x 100,000) x 15%

= 7,537

Sample 2

Premium liabilities excl. PfAD = 39,694 + 4,550 + 4,000 + 2,000 = 50,244

30% x NWP = 30% x 100,000 = 30,000

Max(50,244, 30,000) x 15%

= 7,537

Common errors included:

- Stating that a decrease in equity will result in a decrease of ROE
- Assuming there is no impact on net income
- Failing to explain how a change in DPAE impacts equity or net income

Part d

Candidates were expected to identify two different methods for evaluating loss ratios underlying the premium liabilities.

Common errors included:

- Stating two methods that were very similar
- Commenting on the nature of data used for evaluating loss ratios and not listing methods

Part e

Candidates were expected to calculate the margin for premium liabilities used for the MCT calculation.

Common errors included:

- Not excluding PfADs from the premium liabilities
- Not including contingent commissions, future reinsurance premium, and maintenance expenses in premium liabilities
- Not applying the maximum correctly
- Omitting the 30% x NWP calculation

QUESTION 15

TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE(S): C1
SAMPLE ANSWERS	
Part a: 0.75 point	