

Final Exam Problems

The course material is vast; you are not expected to memorize all GAAP and IFRS accounting in 24 self-study sessions. The textbook explains the material and the NEAS discussion forum shows how all the procedures are implemented. The homework assignments ensure that you understand the concepts, and the final exam practice problems illustrate how you will be tested.

The practice problems have multiple pieces, designed to provide a complete perspective while enabling you to prepare for the exam efficiently. For example, IFRS 17 is a complex system that requires numerous layers; to derive insurance revenue, one must first work out fulfilment cash flows, acquisition cash flows, the risk adjustment for non-financial risk, the contractual service margin, insurance finance expense, and accretion of interest. The discussion forum has practice problems for each piece, but you are not expected to know hundreds of pages for four modules. Many topics are specific to special circumstances, such as reinsurance, loss scenarios, or investments. Rather, the discussion forum shows you the type of problems on the final exam. The format of the problems will be the same on the coming exam, though the figures will be different.

FA Module 20 GAAP premium deficiency

focus on agents' commission, underwriting costs, deferrable expenses, estimated costs for other incurred claims at nominal and present values, estimated claims for unexpired portion of the policy year at nominal and present values, deferred policy acquisition costs, unearned premium reserve, premium deficiency, pre-tax insurance income;

Expect an exam question covering these topics. Most people are familiar with auto insurance, so the final exam uses auto insurance examples.

On March 1, 2020, an insurer writes a one-year motor insurance contract and collects the full premium of 729. The cash received is held in a non-interest bearing checking account. The estimated claims for the policy year are 561 (nominal value) and 531 (present value). To compute the percentage of the policy term that has been earned, assume all months have 30 days and the year has 360 days. The insurer reports under GAAP (SFAS 60) and uses present values for premium deficiency computations.

[This problem simplifies; insurers earn interest on premiums received (otherwise nominal values and present values would not differ).]

Expenses paid at policy inception are

- ! Agents' commission = 10% of premium
- ! Underwriting costs = 58
- ! Modifications to a web site = 44 (not deferrable)

On November 15, 2020, a claim of 147 is paid. At December 31, 2020, the estimated costs for other incurred claims is 252 (nominal value) and 221 (present value). The estimated claims for the unexpired portion of the policy year are re-estimated as 243 (nominal value) and 180 (present value).

The insurer has four types of claim expenses:

- ! Unearned premium reserves based on the gross premium and the percentage of the policy unearned.
- ! Paid claims, for which nominal value = present value.
- ! Incurred claims, for which nominal value > present value. Both values are estimates. Final exam problems do not ask you to derive present values from nominal values and payment schedules.
- ! Premium deficiency reserves.

Unless the insurer has badly miscalculated, the present values of claims not yet incurred will be less than the unearned premium reserves; the difference between them is the deferred policy acquisition expenses and the

present value of the profit margin. Premium deficiency reserves are used when the estimated present value of claims not yet incurred is more than the unearned premium reserves.

This practice problem shows the computation of premium deficiency reserves. The estimated present value of claims not yet incurred at year-end is larger than the unearned premiums of 121.50, generally resulting from a miscalculation of the premium. For a single policy, the insurer may have misjudged the driver's risk level, but premium deficiency reserves are calculated for blocks of business. For simplicity, this practice problem assumes the insurer writes only one policy.

Question 20.1: Percentage earned

What percentage of the policy year is earned in 2020?

Answer 20.1: Ten months (March 1 through December 31) = $10 / 12 = 83.3333\%$

Final exam problems assume all months are of equal length, to simplify computations.

Question 20.2: DPAC

What is the deferred policy acquisition cost (DPAC) when the policy is written?

Answer 20.2: $10\% \times 729 + 58 = 130.90$

(DPAC = agents' commission percentage \times gross premium + underwriting expenses)

Question 20.3: Incurred claims

What are the incurred claims in 2020?

Answer 20.3: $147 + 252 = 399.00$

(incurred claims = paid claims + nominal value of reserves for unpaid claims)

Modules 21-24 show the computation of incurred claims under IFRS 17, using present values.

Question 20.4: Unearned premium reserve

What is the unearned premium reserve at December 31, 2020?

Answer 20.4: $(1 - 83.3333\%) \times 729 = 121.50$

(unearned premium reserve = gross premium \times percentage of policy still unearned)

Question 20.5: Net unearned premium reserve

What is the net unearned premium reserve (gross unearned premium reserve minus the DPAC before the reduction for the premium deficiency) at December 31, 2020?

Answer 20.5: $(1 - 83.3333\%) \times (729 - 130.90) = 99.68$

(net unearned premium reserve = (gross premium – DPAC) \times percentage of policy still unearned)

The gross premium and the DPAC are amortized at the same rate over the year.

Question 20.6: Deferred policy acquisition cost

What is the unamortized deferred policy acquisition cost (DPAC) at December 31, 2010, before adjusting for the premium deficiency?

$$\text{Answer 20.6: } (1 - 83.3333\%) \times 130.90 = 21.82$$

(unamortized DPAC = DPAC at policy inception \times percentage of policy still unearned)

Question 20.7: Premium deficiency

What is the premium deficiency at December 31, 2020?

$$\text{Answer 20.7: } 180 - 99.68 = 80.32$$

(premium deficiency: insurer elects to use present value of claims not yet incurred – net unearned premium reserve)

Question 20.8: Premium deficiency reserve

What is the premium deficiency reserve at December 31, 2020?

$$\text{Answer 20.8: } 80.32 - 21.82 = 58.50 \text{ or } 180 - 121.50 = 58.50$$

(premium deficiency reserve = premium deficiency – unamortized DPAC)

Question 20.9: Earned premium

What is the earned premium in 2020?

$$\text{Answer 20.9: } 83.3333\% \times 729 = 607.50$$

(earned premium = percentage earned \times gross premium)

Question 20.10: Losses and expenses

What are losses and expenses in 2020?

$$\text{Answer 20.10: } 44 + 147 + 252 + 130.90 + 58.50 = 632.40$$

(losses and expenses = non-deferrable expenses + claims paid + *nominal* value of unpaid claims that have already occurred + amortization of DPAC + DPAC reduced for premium deficiency + premium deficiency reserve; DPAC here is reduced to zero, so the full DPAC is amortized in 2020)

Question 20.11: Pre-tax income from insurance contract

What is the pre-tax income from this insurance contract in 2020?

$$\text{Answer 20.11: } 607.50 - 632.40 = -24.90$$

(pre-tax income = earned premium – expenses & losses)

