

Reading: CIA.IFRS17-DR
Model: n/a
Problem Type: IFRS-17 Fulfillment Cash Flow (FCF)

IFRS-DR (020) - (Problem 1)

Find Calculate the fulfillment cash flows for issue years 2021 - 2025 as at Dec 31, 2024.

Given Assume the risk adjustment applied to issue year discounted cash flows = 0.08

AY	undiscont'd liabilities	maturity date	risk-free rate	liquidity premium
2021	0	2021-06-30	1.66%	0.69%
2022	700	2022-06-30	1.73%	0.78%
2023	3,500	2023-06-30	1.83%	0.89%
2024	5,950	2024-06-30	1.92%	0.99%
2025	6,490	2025-06-30	2.04%	1.08%

<== *Excel exhibits in appendix call this: "illiquidity premium"*

age	projected cash flow as % of undiscounted liabilities					total
	2025	2026	2027	2028	2029	
60	100%	--	--	--	--	100%
48	100%	--	--	--	--	100%
36	50%	50%	--	--	--	100%
24	55%	30%	15%	--	--	100%
12	40%	30%	15%	15%	--	100%

Step 1a use a bottom-up approach to calculate a selected discount rate for each year

= (risk-free rate) + (liquidity premium)

	(1)	(2)	(1) + (2)	
maturity date	risk-free rate	liquidity premium	discount rates	
2021-06-30	1.66%	0.69%	2.35%	<== this discount rate forms part of the yield curve
2022-06-30	1.73%	0.78%	2.51%	<== this discount rate forms part of the yield curve
2023-06-30	1.83%	0.89%	2.72%	<== this discount rate forms part of the yield curve
2024-06-30	1.92%	0.99%	2.91%	<== this discount rate forms part of the yield curve
2025-06-30	2.04%	1.08%	3.12%	<== this discount rate forms part of the yield curve

Step 1b calculate the discount factors for each payment period

	2025	2026	2027	2028	2029	
yield curve	2.35%	2.51%	2.72%	2.91%	3.12%	
timing	0.5	1.5	2.5	3.5	4.5	<==
discount factor	0.9885	0.9635	0.9351	0.9045	0.8709	<== (1 + yield curve)^(-timing)

Step 2a calculate projected cash flows using the given projected cash flow percentages

AY	2025	2026	2027	2028	2029	total	
2021	0	0	0	0	0	0	<== allocate total to payment years based on payment pattern
2022	700	0	0	0	0	700	
2023	1,750	1,750	0	0	0	3,500	
2024	3,273	1,785	892	0	0	5,950	
2025	2,596	1,947	974	974	0	6,490	
total	8,319	5,482	1,866	974	0	16,640	

Step 2b allocate projected cash flows to issue year AND calculate discounted cash flows

issue yr	2025	2026	2027	2028	2029	discnt'd	
2021	350	0	0	0	0	346.0	<== sum-product of issue year allocation and yield curve
2022	1,225	875	0	0	0	2,053.9	
2023	2,511	1,768	446	0	0	4,602.5	
2024	2,934	1,866	933	487	0	6,011.0	
2025	1,298	974	487	487	0	3,116.4	
total	8,319	5,482	1,866	974	0	16,129.8	

* for 2021-2024: issue year allocation = average of (current row, next row) from Step 2a

* for 2025: issue year allocation = 0.5 x (projected undiscounted cash flow from Step 2a)

Step 3 calculate the final FCFs (Fulfillment Cash Flows)

= discounted cash flows + risk adjustment

issue yr	discnt'd cash flows	risk adj. *	FCFs	
2021	346.0	27.7	373.6	<== final answers
2022	2,053.9	164.3	2,218.2	<== final answers
2023	4,602.5	368.2	4,970.7	<== final answers
2024	6,011.0	480.9	6,491.8	<== final answers
2025	3,116.4	249.3	3,365.7	<== final answers
total	16,129.8	1,290.4	17,420.1	

* risk adjustment = 0.08 x (issue year discounted cash flows)

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Model: n/a
Problem Type: IFRS-17 Fulfillment Cash Flow (FCF)

IFRS-DR (020) - (Problem 2)

Find Calculate the fulfillment cash flows for issue years 2021 - 2025 as at Dec 31, 2024.

Given Assume the risk adjustment applied to issue year discounted cash flows = 0.04

AY	undiscont'd liabilities	maturity date	risk-free rate	liquidity premium
2021	0	2021-06-30	1.66%	0.68%
2022	800	2022-06-30	1.74%	0.82%
2023	3,200	2023-06-30	1.84%	0.88%
2024	3,840	2024-06-30	1.95%	1.02%
2025	4,190	2025-06-30	2.04%	1.09%

<== Excel exhibits in appendix
 call this: "illiquidity premium"

age	projected cash flow as % of undiscounted liabilities					total
	2025	2026	2027	2028	2029	
60	100%	--	--	--	--	100%
48	100%	--	--	--	--	100%
36	60%	40%	--	--	--	100%
24	55%	30%	15%	--	--	100%
12	35%	30%	20%	15%	--	100%

Step 1a use a bottom-up approach to calculate a selected discount rate for each year

= (risk-free rate) + (liquidity premium)

	(1)	(2)	(1) + (2)	
maturity date	risk-free rate	liquidity premium	discount rates	
2021-06-30	1.66%	0.68%	2.34%	<== this discount rate forms part of the yield curve
2022-06-30	1.74%	0.82%	2.56%	<== this discount rate forms part of the yield curve
2023-06-30	1.84%	0.88%	2.72%	<== this discount rate forms part of the yield curve
2024-06-30	1.95%	1.02%	2.97%	<== this discount rate forms part of the yield curve
2025-06-30	2.04%	1.09%	3.13%	<== this discount rate forms part of the yield curve

Step 1b calculate the discount factors for each payment period

	2025	2026	2027	2028	2029	
yield curve	2.34%	2.56%	2.72%	2.97%	3.13%	
timing	0.5	1.5	2.5	3.5	4.5	<==
discount factor	0.9885	0.9628	0.9351	0.9026	0.8705	<== (1 + yield curve)^(-timing)

Step 2a calculate projected cash flows using the given projected cash flow percentages

AY	2025	2026	2027	2028	2029	total	
2021	0	0	0	0	0	0	<== allocate total to payment years based on payment pattern
2022	800	0	0	0	0	800	
2023	1,920	1,280	0	0	0	3,200	
2024	2,112	1,152	576	0	0	3,840	
2025	1,467	1,257	838	629	0	4,190	
total	6,299	3,689	1,414	629	0	12,030	

Step 2b allocate projected cash flows to issue year AND calculate discounted cash flows

issue yr	2025	2026	2027	2028	2029	discnt'd	
2021	400	0	0	0	0	395.4	<== sum-product of issue year allocation and yield curve
2022	1,360	640	0	0	0	1,960.5	
2023	2,016	1,216	288	0	0	3,432.9	
2024	1,789	1,205	707	314	0	3,873.1	
2025	733	629	419	314	0	2,005.4	
total	6,299	3,689	1,414	629	0	11,667.4	

* for 2021-2024: issue year allocation = average of (current row, next row) from Step 2a

* for 2025: issue year allocation = 0.5 x (projected undiscounted cash flow from Step 2a)

Step 3 calculate the final FCFs (Fulfillment Cash Flows)

= discounted cash flows + risk adjustment

issue yr	discnt'd cash flows	risk adj. *	FCFs	
2021	395.4	15.8	411.2	<== final answers
2022	1,960.5	78.4	2,039.0	<== final answers
2023	3,432.9	137.3	3,570.2	<== final answers
2024	3,873.1	154.9	4,028.1	<== final answers
2025	2,005.4	80.2	2,085.6	<== final answers
total	11,667.4	466.7	12,134.1	

* risk adjustment = 0.04 x (issue year discounted cash flows)