11. (3 points)

The following information is available for a property and casualty insurance company and its reinsurance contract as at December 31, 2014:

- Estimated undiscounted value of the liabilities to be commuted: $2,000,000
- Calendar year payment pattern (payments assumed to be made mid-year):

2015	10%
2016	30%
2017	75%
2018	100%

- Risk free rate: 1%
- Required margin: 10%
- Target capital to required capital ratio: 2.5
- Risk cost of capital: 8%

Calculate the commuted value of claims as at December 31, 2014.

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QUESTION *11*	
TOTAL POINT VALUE: 3	LEARNING OBJECTIVE: *C1*
SAMPLE ANSWERS	

Sample Solution #1

Payment pattern		10%	30%	75%	100%
Estimated Payments in Period	$2,000,000	$200,000	$400,000	$900,000	$500,000
Payment Duration Duration Matched		0.5	1.5	2.5	3.5
Risk Free Rate		1%	1%	1%	1%
Present Value Claims	$1,953,856	$199,007	$394,074	$877,888	$482,887
Cash Flow Undiscounted Future Payments		$2,000,000	$1,800,000	$1,400,000	$500,000
Required Margin		10%	10%	10%	10%
Regulatory Capital at 250%		$500,000	$450,000	$350,000	$125,000
Risk Cost of Capital		8%	8%	8%	8%
Cost of Capital in Period		$40,000	$36,000	$28,000	$10,000
Duration		1	2	3	4
Discount Rate		1%	1%	1%	1%
Risk Margin	$111,681	$39,604	$35,291	$27,177	$9,610
Commuted Value	$2,065,537				

Sample Solution #2

Payments discounted = (0.1 * 2M)/1.01$^{.5}$ + (0.2 * 2M)/1.01$^{1.5}$ + (0.45 * 2M)/1.01$^{2.5}$ + (0.25 * 2M)/1.01$^{3.5}$ = $1,953,856

Year	Payment Remaining	Required margin (10%)	Target Capital (2.5)	Cost of Capital (8%)
2015	$2,000,000	$200,000	$500,000	$40,000
2016	$1,800,000	$180,000	$450,000	$36,000
2017	$1,400,000	$140,000	$350,000	$28,000
2018	$500,000	$50,000	$125,000	$10,000
2019	$0	$0	$0	$0

Discounted cost of capital = 40,000/1.01^{1} + 36,000/1.01^{2} + 28,000/1.01^{3} + 10,000/1.01^{4}
= $111,691

Commuted Value = $1,953,856 + $111,691 = $2,065,537

EXAMINER'S REPORT
Candidates did not perform well on this question. It was evident that candidates were unfamiliar with this topic. Vast majority of the candidates were able to correctly calculate the present value of loss payments and earned partial credit on this question. However, most candidates were unable to correctly calculate the discounted cost of capital. Other than calculation errors, some of the most common errors were: 1. Assuming amount of capital is the same as claim payment made during the year 2. Confusing the Risk Cost of Capital 8% with the Risk Free rate 1% when discounting the amounts to present value: Candidates used risk cost of capital as discount rate. 3. Assuming the period of discounting the cost of capital is the same as claim payment: Candidates discounted cost of capital using the mid-year assumption instead of end of year.