

20. (3 points)

The following information is available as of December 31, 2015 for a U.S.-domiciled multinational insurance company (all figures are in millions of dollars):

- IFRS Assets: 850
- Minimum Capital Requirement (MCR): 250
- Best Estimate of Liabilities: 150
- The risk-free rate is 0.625%, and the illiquidity premium is 0.25%.
- The cost of capital above the risk-free rate ( $R-i$ ) is 6%.
- Capital is assumed to be held until the end of each year.
- Loss payments are expected to occur for the next 3 years, during the middle of each year.
- The company uses its internal model to calculate Solvency II quantitative capital requirements.
- The following table provides the one-year value at risk (VaR) model results:

Percentile	VaR
95.0%	150
99.0%	200
99.5%	300
99.9%	550

a. (0.75 point)

Briefly describe three requirements for the company's internal model to be approved for use in calculating Solvency II quantitative capital requirements.

b. (2.25 points)

Determine the actions of the regulator based on the Solvency II quantitative capital requirements. Assume that the Solvency Capital Requirement (SCR) is constant across all future years.

**SPRING 2017 EXAM 6U SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 20</b>				
<b>TOTAL POINT VALUE: 3</b>		<b>LEARNING OBJECTIVE: C3</b>		
<b>SAMPLE ANSWERS</b>				
<b>Part a: 0.75 point</b>				
<ul style="list-style-type: none"> <li>• Model is used in running the business</li> <li>• Model has been validated by an independent third party</li> <li>• Model is documented appropriately</li> </ul>				
<b>Part b: 2.25 points</b>				
	Total/Formula	2016	2017	2018
Required Capital (SCR)	Given	300	300	300
Risk Cost of Capital	R-i (Given)	6%	6%	6%
Cost of Capital in Period	$SCR \cdot (R-i) = 300 \cdot .06 = 18$	18	18	18
Duration	Based on how long capital is held	1.0	2.0	3.0
Discount Rate (i)	$0.625\% + .25\%$	0.875%	0.875%	0.875%
Associated Risk Margin	53.07 For each year = Cost of Capital in Period * $(1 + \text{Discount Rate})^{-(\text{Duration})}$ $= 18 \cdot (1.00875)^{-2} = 17.69$ for 2017 Associated Risk Margin (Total) = Sum of years = $17.84 + 17.69 + 17.54 = 53.07$	17.84	17.69	17.54

  

	Internal
Best estimate liabilities (Given)	150
Risk margin	53.07
Solvency capital requirement	300
Total required assets	503.07

IFRS Assets = 850 which is > 503.07

Therefore, no regulatory intervention required/company will be subject to regulatory intervention/no regulatory intervention required

Some candidates applied a payout pattern and discounted the best estimate of liabilities. Graders accepted this approach.

## SPRING 2017 EXAM 6U SAMPLE ANSWERS AND EXAMINER'S REPORT

### EXAMINER'S REPORT

Candidates were expected to know details of the Solvency II capital requirements.

#### Part a

Candidates were expected to list three requirements with brief description for each.

Common errors include:

- Discussing general principles of model design, which are not required for approval of an internal model under Solvency II
- Stating specific assumptions that an internal model might make rather than the requirements of Solvency II
- A discussion on values that an internal model might be able to calculate
- Incorrectly stating that an internal model needs to address all risks to a company
- Confusing 'disclosure' and 'appropriate documentation'

#### Part b

Candidates were expected to be able to determine individual components: SCR, risk margin and best estimates of liabilities. From these components, candidates were expected to be able to determine free surplus and actions that a regulator would need to take, depending on the free surplus results.

Common errors include:

- Incorrectly using liabilities as the basis for the cost of capital
- Failing to include SCR in the calculate of free surplus
- Adding MCR to SCR (MCR is already a portion of SCR)
- Using MCR instead of SCR in the cost of capital calculation
- In the calculation of 'Liabilities', incorrectly used the 'Best Estimate of Liabilities' amount as a payment to be made by the company annually, for the next three years