

Reading: Odomirok.19-RBC
Model: 2017.Spring #19
Problem Type: Calculating the RBC charges (not the ratio)

(RBC (practice 02)) 2017.Spring #19 a-Question

Given
random

item	RBC charge
Investment income due and accrued	1,000
Federal income tax recoverable	1,500
Recoverable from parent, subsidiaries, or affiliates	3,000
Reinsurance recoverable	4,000
Reserve	22,000
Written premium	17,000
Cash and cash equivalents	4,500
Unaffiliated bond	11,000
Unaffiliated stocks	8,500
Real estate	2,000
Asset concentration	5,500
Other non-insurance subsidiaries	8,000
Investments in insurance affiliates	500
Non-Tabular Discount	4,500
Tabular Discount in Reserves	2,500

Find (a) RBC total risk charge
(b) range of surplus corresponding to RAL (*Regulatory Action Level*)

Note This question was ambiguous and many different solutions were accepted. My answer corresponds to **Sample Answer 2** because that seemed the simplest. (*It might be helpful also to spend a moment looking over the answers in the examiner's report.*)

Concept You just have to figure out which risk category each RBC charge goes into. Then apply the basic formula for the RBC charge.

Concept It's straightforward except for 3 items:

- i Reinsurance recoverable is split 50/50 between R_3 and R_4 .
- ii Asset concentration factor can be split in any proportion between R_1 and R_2 .
(*I chose 100% for R_2 .*)
- iii Other non-insurance subsidiaries can go into either R_1 or R_2 , depending on whether it is considered a fixed-income or equity investment.

RBC Ratio You cannot calculate the RBC Ratio because they don't provide TAC (Total Adjusted Capital)

Note *This exam problem is outdated because it uses an earlier version of the RBC formula that didn't include catastrophe or operational risk. For the purposes of this problem, make the following assumptions:*

Rcat	=	0
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operational risk	=	0
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item	RBC charge	S	F	E	C	reserve	NWP
		R ₀	R ₁	R ₂	R ₃	R ₄	R ₅
Investment income due and accrued	1,000				1.0		
Federal income tax recoverable	1,500				1.0		
Recoverable from parent, subsidiaries, or affiliates	3,000				1.0		
Reinsurance recoverable	4,000				0.5	0.5	
Reserve	22,000					1.0	
Written premium	17,000						1.0
Cash and cash equivalents	4,500		1.0				
Unaffiliated bond	11,000		1.0				
Unaffiliated stocks	8,500			1.0			
Real estate	2,000			1.0			
Asset concentration	5,500			1.0			
Other non-insurance subsidiaries	8,000		1.0				
Investments in insurance affiliates	500	1.0					
reasoning from Sample 2 from examiner's report ==>		500	23,500	16,000	7,500	24,000	17,000

sum check: **88,500**sum check: **88,500**

difference: 0

$$\text{RBC charge} = R_0 + [R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2]^{0.5} = 42,087 \quad \text{<== final answer (part a)}$$

(sample answer #7 in examiner's report)

(part b)Let NTD = Non-Tabular Discount = **4,500** (given)Let TD = Tabular Discount = **2,500** (given)

Required Facts:

* RAL corresponds to a range of 100-150% for the RBC ratio

* RBC Ratio = TAC / ACL = TAC / 21044 (ACL = 50% of the RBC charge from part a)

* TAC = PHS - NTD - TD = PHS - 7000

Then

$$100\% = (PHS - 7000) / 21044 \implies PHS = 28,044 \quad \text{<== low end of range}$$

$$150\% = (PHS - 7000) / 21044 \implies PHS = 38,565 \quad \text{<== high end of range}$$