The Abdus Salam
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Workshop on Understanding and Evaluating Radioanalytical Measurement Uncertainty

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Uncertainty in Gamma Spectrometry .
Exercise 1

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I t a l y

Symbol	Quantity	Value	Unit	Standard Uncertainty	Relative Standard Uncertainty
					(%)
$T_{1/2}$	Half-life	462.6	d	0.4	0.0865
I_γ	Photon emission probability	3.65	%	0.06	1.6438
A_c	Activity at reference date	20130	Bq	50	0.2484
T	Counting Time	80000	s	160	0.2000
C_T	Gross counts	163133	-	403.90	0.2476
C_B	Background counts	14013	-	118.38	0.8448
C_N	Net counts	149120	-	420.89	0.2822
ΔT	Decay time	1095.75	d	negligible	negligible
DF	Decay factor	0.19362	-	0.00027488	0.1420
ε	**Counting efficiency**	**1.31024**	**%**	**0.0223**	1.7040

Counting efficiency: Uncertainty budget		
Source of uncertainty	**Expression**	**Value (%)**
Counting statistics	$u(C_N)/C_N$	0.2822
Timing	$u(T)/T$	0.2000
Emission probability	$u(I_\gamma)/I_\gamma$	1.6438
Standard source activity	$u(A_c)/A_c$	0.2484
Decay	$u(DF)/DF$	0.1420
Combined standard uncertainty	**quadratic sum**	**1.704**