



### **Earth's magnetic field measurement (10 points)**

Write down the numbers 0 to 9 in the following table:

0	1	2	3	4	5	6	7	8	9

#### **Gouy balance and magnetic moment**

<b>A.1</b> (0.2pt)			
au =			



 $[z_{\mathsf{min}}, z_{\mathsf{max}}] =$ 

 $\mathsf{mm}$ 

A1-2
English (Official)

0.8pt)						
z (mm)						
$B_z$ (mT)						
ſ						





<b>A.3</b> (0.9pt (z <sub>1</sub> , z <sub>2</sub> ) =	)	mm						
	i (A)							
-	$B_{z_1}$ (mT)							
	$B_{z_2}$ (mT)							
Plotted qu	uantities (ur	nits):	1	I	1		1	

 $\alpha =$ 





<b>A.4</b> (0.8p	t)						
	i (A)						
	$m_{ m f}$ (g)						
Plotted q	uantities (ur	nits):					
$m_{ m m}$ =	±						





	<i>z</i> (mm)						
	$B_z$ (mT)						
	$\mathcal{L}_{\mathcal{Z}}$ ()						
ted qua	ntities (u	ınits):					



A1-6
English (Official)

<b>A.6</b> (0.2pt	)
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 $m_{
m m} = \pm$ 





#### Determining the earth's magnetic field

3pt)

quantity	unit	Fixed (F) / Varying (V)

Equation on quantitie	es:		
Schematic:			



A1-8
English (Official)

					ts):			_									
d a	uanti	ties	(ur	nits):											1		
* Y			(41						_			1				1	
	Ħ																



A1-9
English (Official)

**B.3** (0.7pt)

Specify the relevant quantity for each measure:

Relevant quantity in measure 1 (unit): Period:  $T_1 =$ 

Relevant quantity in measure 2 (unit): Period:  $T_2 =$ 

Expression of  $C_f$ :

 $C_{\rm f} = \pm N \cdot m^2 \cdot rad^{-1}$ 

**B.4** (0.3pt)

Expression of  $L_c$ :

Numerical value  $L_{\rm c}$  =

 $(C_{\rm f}/L)/(m_{\rm m}B_{\rm e})\in$ 



A1-10
English (Official)

$\theta_0$ (rad)						
$\theta_{ m eq}$ (rad)						
quantities (ui	nits):					





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A1-12
English (Official)

cont ibriu ired	t. <b>)</b> m 3: <i>L</i> : quantit	= ies (	units)	:								
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	FHH-					· 	 				 	



A1-13
English (Official)

#### B.6 (cont.)

Plotted quantities (units):

Equilibrium 1	Equilibrium 2	Equilibrium 3

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 $B_{\rm e} =$ 

 $\pm$