



# **The Stern-Gerlach Experiment**<sup>1</sup>

Speed of the Silver Atoms

**A.1** (0.5 pt)

Value of  $v_z =$ 

#### **The Basic Expression**

**B.1** (2 pt)

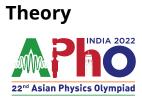
 $\Delta x =$ 

#### The Inhomogeneous Magnetic Field

**C.1** (1.5 pt)

 $\vec{B}(x,y,0)$  =

<sup>&</sup>lt;sup>1</sup>H. S. Mani (former Director, HRI, Prayagraj) and Gautam Datta (DAIICT, Gandhinagar) were the principal authors of this problem. The contributions of the Academic Committee, Academic Development Group, and the International Board are gratefully acknowledged.





 $\textbf{C.2}~(0.5~\mathrm{pt})$ 

Direction at point  ${\it R}$  :

Direction at point  ${\it P}_0$  :

 $\textbf{C.3}\;(0.5\;\mathrm{pt})$ 

In the air gap region  $\vec{B}(x,0,0)$  =

#### **The Force**

**D.1** (0.5 pt)  $F_x =$ 

The Field and the Field Gradient





<b>E.1</b> (2 pt)	
$B_P =$	
$dB_P/dx$ =	

# The magnetic moment of the silver atom

 $\textbf{F.1} \; (1.5 \; \mathrm{pt})$ 

 $\mu_s$  =

# The spread in the line on the screen

**G.1** (0.5 pt)

 $\delta x$  =

# Error in the evaluation of the magnetic moment of the solver atom





**H.1** (0.5 pt)

 $\delta \mu_s$  =