

# Magnetic Materials

## Previous Year JEE Problems

- 1 Q. Two short bar magnets of length 1 cm each have magnetic moments  $1.20\text{Am}^2$  and  $1.00\text{Am}^2$  respectively. They are placed on a horizontal table parallel to each other with their N poles pointing towards the South. They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the midpoint O of the line joining their centres is close to :- (Horizontal component of earth's magnetic induction is  $3.6 \times 10^{-5}\text{Wb/m}^2$ ) (1)  $3.6 \times 10^{-5}\text{Wb/m}^2$  (2)  $2.56 \times 10^{-4}\text{Wb/m}^2$  (3)  $3.50 \times 10^{-4}\text{Wb/m}^2$  (4)  $5.80 \times 10^{-4}\text{Wb/m}^2$

[JEE(Mains) – 2013]

Sol.

$$B_{\text{net}} = B_1 + B_2 + B_{\text{earth}}$$

$$= \frac{\mu_0}{4\pi} \frac{M_1}{r^3} + \frac{\mu_0}{4\pi} \frac{M_2}{r^3} + B_{\text{earth}}$$

$$= 10^{-7} \left[ \frac{1 + 1.2}{(10^{-1})^3} \right] + 3.6 \times 10^{-5}$$

$$= 2.56 \times 10^{-4} \text{ Web/m}^2$$

