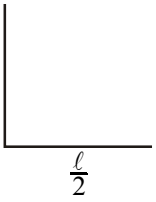
19 Magnetism and Matter

Diagram Based Questions :

1. A steel wire of length ℓ has a magnetic moment M. It is bent in L-shape (Figure). The new magnetic moment is



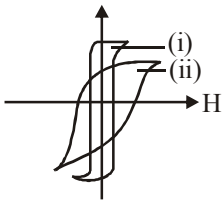
(a) M (b) $\frac{M}{\sqrt{2}}$

(c) $\frac{M}{2}$ (d) 2M

2. Imagine rolling a sheet of paper into a cylinder and placing a bar magnet near its end as shown in figure. What can you say about the sign of $\vec{B}.d\vec{A}$ for every area $d\vec{A}$ on the surface?

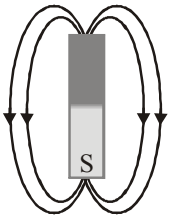
(a) Positive
(b) Negative
(c) No sign
(d) Can be positive or negative

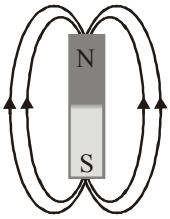
3. The B – H curve (i) and (ii) shown in fig associated with

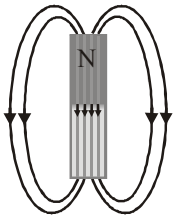


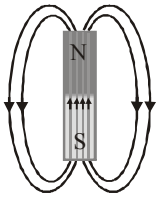
(a) (i) diamagnetic and (ii) paramagnetic substance
(b) (i) paramagnetic and (ii) ferromagnetic substance
(c) (i) soft iron and (ii) steel
(d) (i) steel and (ii) soft iron

4. The magnetic field lines due to a bar magnet are correctly shown in

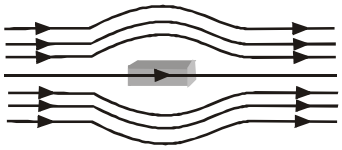
(a) 

(b) 

(c) 

(d) 

5. The given figure represents a material which is



(a) paramagnetic (b) diamagnetic
(c) ferromagnetic (d) none of these

Solution

1. **(b)** Magnetic moment, $M = m\ell$

$\frac{M}{\ell} = m$, where m is the polestrength.

Therefore distance between poles

$$= \sqrt{(\ell/2)^2 + (\ell/2)^2} = \frac{\ell}{\sqrt{2}}$$

So, $M' = \frac{m\ell}{\sqrt{2}} = \frac{M}{\sqrt{2}}$

2. **(b)** The field is entering into the surface so flux is negative.

3. **(c)** **4.** **(d)** **5.** **(b)**