



## PHYSICS

### BOOKS - PEARSON IIT JEE FOUNDATION

#### THE MAGICAL MAGNETISM

##### Example

1. Why the magnet suspended freely, aligns itself in the north-south direction of the Earth?

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2. A man can swim in still water at a speed of  $6\text{ kmph}$  and he has to cross the river and reach just opposite point on the other bank. If the river is

flowing at a speed of  $3\text{ kmph}$ , and the width of the river is  $2\text{ km}$ , the time taken to cross the river is (in hours)



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3. Why the magnet suspended freely, aligns itself in the north-south direction of the Earth?



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4. Why do most of the rivers flow toward the east?



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### Very Short Answer Type Questions Fill In The Blanks

1. Every magnet has both \_\_\_\_\_



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2. Magnets made by human beings are called \_\_\_\_\_



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3. Diamagnetic substances are feeby attracted by magnets.



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4. Large deposits of magnetite were found in Asia Minor in a distric called  
\_\_\_\_\_



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5. The property of attracting iron by a magnet is called \_\_\_\_\_



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## Very Short Answer Type Questions Select The Correct Alternative From The Given Options

1. Mineral from which the first magnet was found is \_\_\_\_\_

- A. Iron
- B. Magnus
- C. Magnetite
- D. Magnesia

**Answer: C**



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2. Magnetism was first found around \_\_\_\_\_

- A. 500<sub>BCE</sub>
- B. 600<sub>BCE</sub>



C. 700<sub>BCE</sub>

D. 800<sub>BCE</sub>

**Answer: D**



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**3. Lodestone means \_\_\_\_**

- A. stone which does not attract iron pieces.
- B. stone which indicates the north-south direction.
- C. Stone which behaves like a diamagnetic
- D. Substance which is non-magnetic in nature.

**Answer: B**



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4. Which of the following is a non- magnetic substance ?

- A. Nickel
- B. Iron
- C. Cobalt
- D. None of these

**Answer: D**



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5. Freely suspended bar magnet comes to rest pointing north-south direction such that

- A. The North Pole of bar magnet points to geometric North Pole of earth.
- B. The North Pole of bar magnet points to geometric South Pole of earth.

C. The South Pole of bar magnet points to geometric North Pole of earth.

D. The South Pole of bar magnet points to geometric North Pole of earth.

**Answer: A**



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**6.** Irrespective of shape, all magnets have\_\_\_\_\_

A. Only the North Pole

B. Only the South Pole

C. A large number of poles

D. Both the North Pole and South Pole .

**Answer: D**



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7. Dipping a bar magnet into a box of iron filings results in a larger number of iron filings stick to the poles or ends than at the center portion because \_\_\_\_\_.

- A. Only ends are dipped in the box
- B. They are ends of a magnet
- C. They are easier to attach at the edges than at the centre.
- D. The strength of the magnet is more at the poles

**Answer: D**



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8. An imaginary line bisecting the length of bar magnet is called \_\_\_\_\_

- A. Magnetic axis
- B. Magnetic equator

C. Effective length of magnet

D. Length of magnet

**Answer: A**



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### Short Answer Type Questions

1. Define the following terms.

(a) Magnetic poles

(b) Magnetic North Pole

( c) Magnetic South Pole

(d) Magnetic axis

( e) Length of a bar magnet

(f) Effective length of a bar magnet

(g) Magnetic equator



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2. What the the properties of a bar magnet ?



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3. What the advantages of an electromagnet ?



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4. Mention some of the applications of a magnet .



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5. Differentitate a temporary magnets from a permanent magnet.



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6. What is meant by dipole in magnetism?



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7. What is meant by magnetizing a material and how does this happen ?



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8. The bar magnet suspended freely aligns itself in the north-south directions. Why?



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9. What is the use of compass for sailors ?



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10. Why are the magnets used in earphones or speakers?



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11. A boy playing in sand with a magnet notices some dust or particles attracted to magnet. What does this imply ?



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12. Match the following columns.

Column A		Column B	
(a) Heating a magnet	( )	(p) Compass	
(b) Directive property of a magnet used in	( )	(q) Demagnetization	
(c) Reversing poles of a magnet	( )	(r) Alternating current	
(d) Permanent electromagnet	( )	(s) Soft iron	
(e) Temporary electromagnet	( )	(t) Steel	



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13. Explain with diagram what happens when a bar magnet is cut into two pieces.

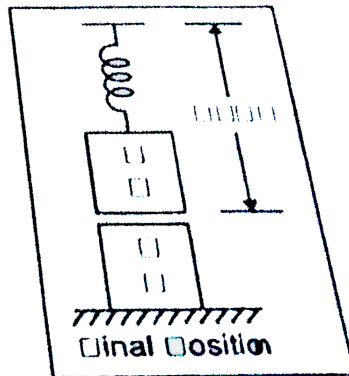
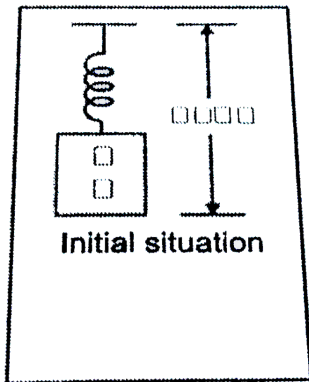
(a) Along its magnetic axis

(b) Along its magnetic equator



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14. Consider a magnet which is hung by the hook of a spring as shown in figure. Then what could be the possible option from the following to attain the final position shown in figure.



(a) X,A and North Pole and Y,B are South Pole.

(b) X,B and North Pole and Y,A are South Pole.

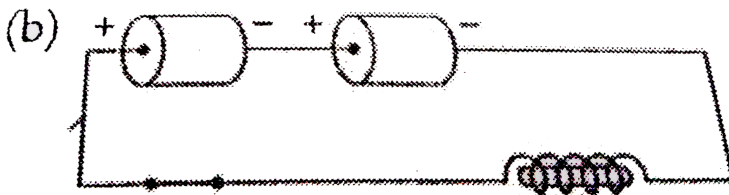
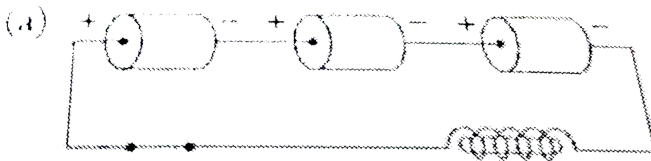
(c) X,B are South Pole and Y,A are North Pole

(d) X,A are south Pole and Y,B are South Pole



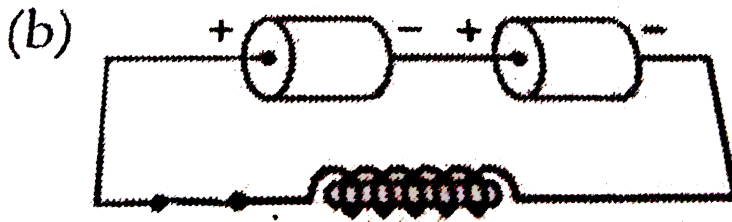
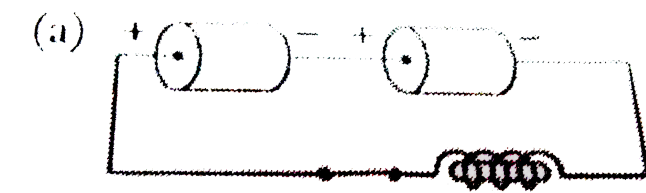
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15. Which of the following arrangements produces a stronger electromagnet and why?



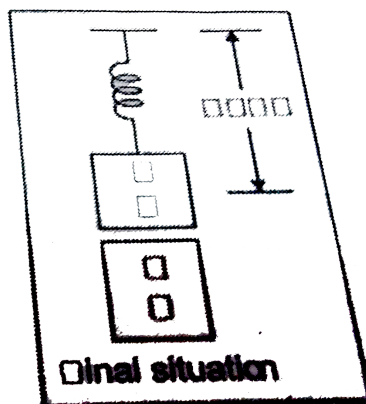
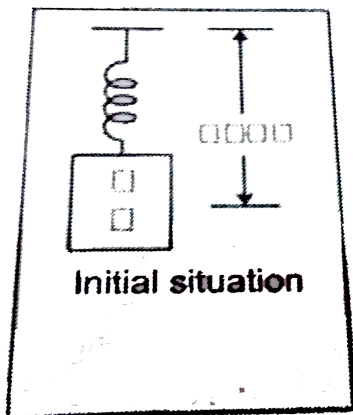
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16. Which of the following arrangements produces a stronger electromagnet and why?



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17. Consider a magnet which is hung to the hook of a spring as shown in figure. Then what could be the possible option from the following?



(i) X,A are North Pole and Y,B are south Pole

(ii) X, B are North Pole and Y, A are South Pole

(iii) A, B are South Pole and X, Y are North Pole

(iv) X, A are South Pole and Y, B are North Pole.

A. Only(ii)

B. Only (i)

C. Both (i) and (ii)

D. Both (ii) and (iii)

**Answer:**

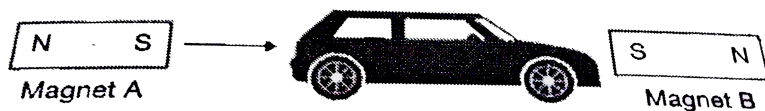


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### Concept Application

1. A toy car ( made of soft iron ) and two bar magnets are arranged as shown in the figure. What would happen if the magnet 'A' is moved

towards the car as shown in the figure. ?



- A. The car will not have any impact due to the motion of the magnet .
- B. The car moves away from magnet A.
- C. The car moves towards magnet A.
- D. The car moves till it is exactly mid-way between the two magnets.

**Answer:**



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2. What happens if the material used to make the armature of an electric bell is changed to steel ?

- A. There will not be any change in the ringing of the bell.
- B. Loudness of the bell ring gradually reduces.

C. Loudness of the bell ring gradually increases.

D. The hammer hits the gong for once and is likely to stop.

**Answer:**



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3. What will be the change in the length of each small bar magnet when a bigger bar magnet is cut into 4 equal parts parallel to the equatorial line ?

A. One-fourth of the initial length

B. Half of the initial length

C. No change in its length

D. One- fourth of the initial length.

**Answer:**



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4. The north and south poles of a bar magnet are situated 0.4 cm inside from the geometric ends of the magnet. If the geometric length of the magnet is 6 cm, then its effective length is \_\_\_\_\_ mm.

A. 48mm

B. 52mm

C. 56mm

D. 54mm

**Answer:**



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5. The effective length of the first magnet is two times that of the second magnet. The effective length of the third magnet is one-third of the first magnet. If the effective length of the second magnet is 7.5 cm, the effective length of the third magnet is \_\_\_\_\_

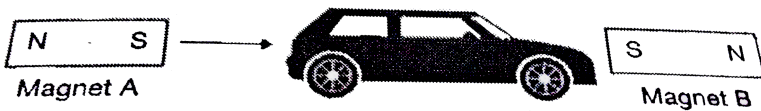
- A. 5 cm
- B. 15 cm
- C. 2.5 cm
- D. 7.5 cm

**Answer:**



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6. A toy car ( made of soft iron ) and two bar magnets are arranged as shown in the figure. What would happen if the magnet 'A' is moved towards the car as shown in the figure. ?



- A. The car will not have any impact due to the motion of the magnet.
- B. The car moves away from magnet A.
- C. The car moves towards magnet A.



D. The car moves till it is exactly mid-way between the two magnets.

**Answer: B**



**Watch Video Solution**

7. What happens if the material used to make the armature of an electric bell is changed to steel ?

- A. There will not be any change in the ringing of the bell.
- B. Loudness of the bell ring gradually reduces.
- C. Loudness of the bell ring gradually increases.
- D. The hammer hits the gong for once and is likely to stop.

**Answer: D**



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8. What will be the change in the length of each small bar magnet when a bigger bar magnet is cut into 4 equal parts parallel to the equatorial line ?

- A. One-fourth of the initial length
- B. Half of the initial length
- C. No change in its length
- D. One-third of the initial length

**Answer: A**



**Watch Video Solution**

9. The north and south poles of a bar magnet are situated 0.4 cm inside from the geometric ends of the magnet. If the geometric length of the magnet is 6 cm, then its effective length is \_\_\_\_\_ mm.

- A. 48

B. 52

C. 56

D. 54

**Answer: B**



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10. The effective length of the first magnet is two times that of the second magnet. The effective length of the third magnet is one-third of the first magnet. If the effective length of the second magnet is 7.5 cm, the effective length of the third magnet is \_\_\_\_\_

A. 5 cm

B. 15 cm

C. 2.5 cm

D. 7.5 cm

**Answer: A**



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## Assessment Test

1. Define axial line of a bar magnet.



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2. What is meant by demagnetization ?



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3. Write the uses of magnet .



**Watch Video Solution**

4. Write short note on double-touch method to magnetize an iron rod.



**Watch Video Solution**

5. (a) What are the advantages of electrical method of magnetization ?

(b) What are the uses of electromagnets ?



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6. What is the difference between magnetic and non-magnetic material ?

Give examples.



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7. How can we find out near which end is North Pole located in a bar magnet?



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8. What is magnetic compass ?



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9. \_\_\_\_\_ type of magnet is used in cranes to lift heavy containers from ships.



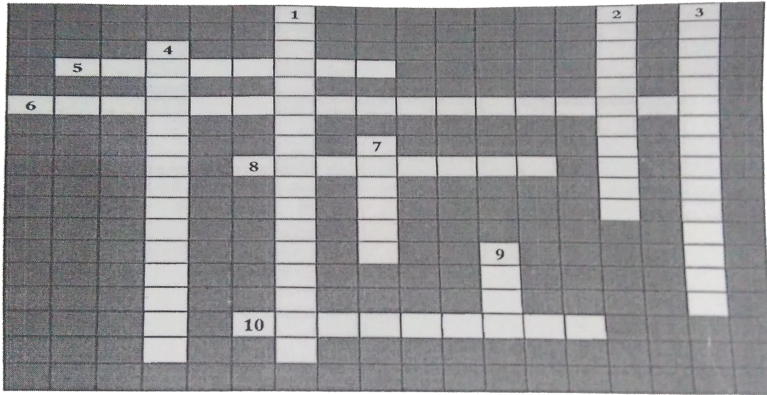
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10. What are different type of magnets? And where are the poles located ?



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[Crossword](#)



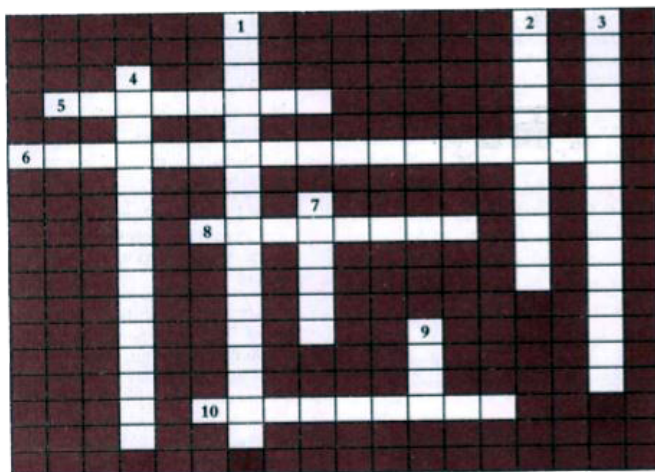
1.

Across

5. Material that is used for making temporary magnets
6. Freely suspended bar magnet takes rest in north-south direction due to
8. Town in which magnetism is discovered
10. Magnet that retain magnetism for long time



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#### Across

5. Material that is used for making temporary magnets
6. Freely suspended bar magnet takes rest in north - south direction due to
8. Town in which magnetism is discovered
10. Magnet that retain magnetism for long time

#### Down

1. Man-made magnets
2. One of the methods of magnetization
3. Imaginary line perpendicular to magnetic axis and passing through its centre
4. Distance between two poles of a bar magnet
7. These poles attract each other
9. The point at which maximum magnetic property is concentrated

2.



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## Test Your Concepts Very Short Answer Type Questions

1. Every magnet has both \_\_\_\_\_



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2. Magnets made by human beings are called \_\_\_\_\_



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3. The substances which are strongly attracted by the magnet are



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4. Large deposits of magnetite were found in Asia Minor in a district called \_\_\_\_\_



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5. The property of attracting iron by a magnet is called \_\_\_\_\_



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6. Mineral from which the first magnet was found is \_\_\_\_\_

- A. Iron
- B. Magnus
- C. Magnetite
- D. Magnesia

**Answer: C**



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7. Magnetism was first found around \_\_\_\_\_

- A. 500 BCE
- B. 600 BCE
- C. 700 BCE
- D. 800 BCE

**Answer: D**



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**8. Lodestone means \_\_\_\_\_**

- A. Stone which does not attract iron pieces.
- B. Stone which indicates the north-south direction.
- C. Stone which behaves like a diamagnetic.
- D. Substance which is non-magnetic in nature.

**Answer: B**



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**9. Which of the following is a non- magnetic substance ?**

- A. Nickel

B. Iron

C. Cobalt

D. None of these

**Answer: D**



**Watch Video Solution**

**10.** Freely suspended bar magnet comes to rest pointing north-south direction such that

A. The North Pole of bar magnet points to geometric North Pole of earth.

B. The North Pole of bar magnet points to geometric South Pole of earth.

C. The South Pole of bar magnet points to magnetic North Pole of earth.

D. The South Pole of bar magnet points to magnetic South Pole of earth.

**Answer: B**



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11. Irrespective of shape, all magnets have\_\_\_\_\_

- A. Only the North Pole
- B. Only the South Pole
- C. A large number of poles
- D. Both the North Pole and the South Pole

**Answer: D**



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12. Dipping a bar magnet into a box of iron filings results in a larger number of iron filings stick to the poles or ends than at the center portion because \_\_\_\_\_.

- A. Only ends are dipped in the box
- B. They are ends of a magnet
- C. They are easier to attach at the edges than at the centre
- D. The strength of the magnet is more at the poles

**Answer: D**



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13. An imaginary line bisecting the length of bar magnet is called \_\_\_\_\_

- A. Magnetic axis
- B. Magnetic equator
- C. Effective length of magnet

D. Length of magnet

**Answer: B**



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### Test Your Concepts Short Answer Type Questions

1. Define pole, axis, equator and magnetic meridian of a bar magnet



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2. Define the following terms.

Magnetic North Pole



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3. Define the following terms.

Magnetic South Pole



**Watch Video Solution**

4. Define the following terms.

Magnetic axis



**Watch Video Solution**

5. Define the following terms.

Length of a bar magnet



**Watch Video Solution**

6. What is the effective length of a bar magnet ?



**Watch Video Solution**



7. Define pole, axis, equator and magnetic meridian of a bar magnet



**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

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18. Match the following columns.

Column A		Column B	
(a) Heating a magnet	( )	(p) Compass	
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19. Explain with diagram what happens when a bar magnet is cut into two pieces.

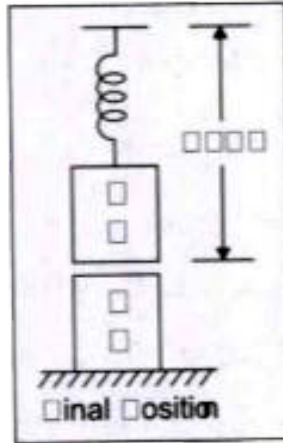
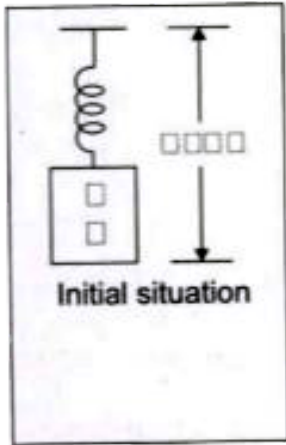
(a) Along its magnetic axis

(b) Along its magnetic equator



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20. Consider a magnet which is hung by the hook of a spring as shown in figure. Then what could be the possible option from the following to attain the final position shown in figure.



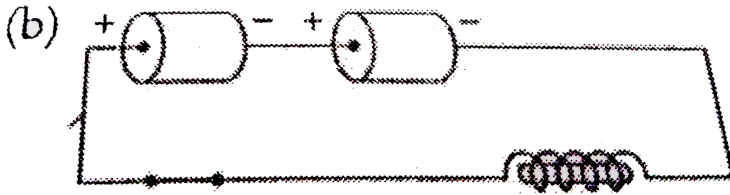
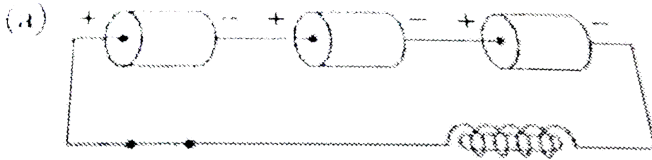
- A. X, A are North Pole and Y, B are South Pole
- B. X, Bare North Pole and Y, A are South Pole
- C. X, Bare South Pole and Y, A are North Pole
- D. X, A are South Pole and Y, B are South Pole

**Answer: A**



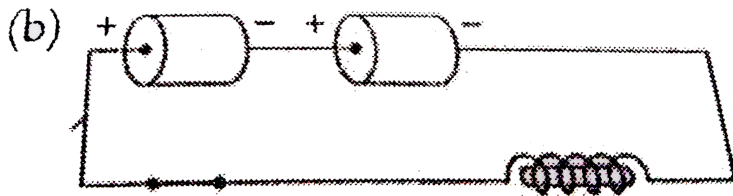
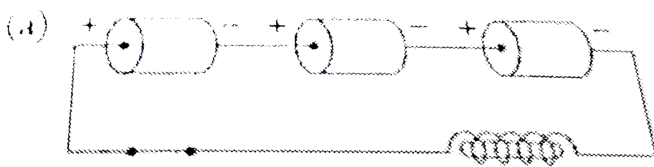
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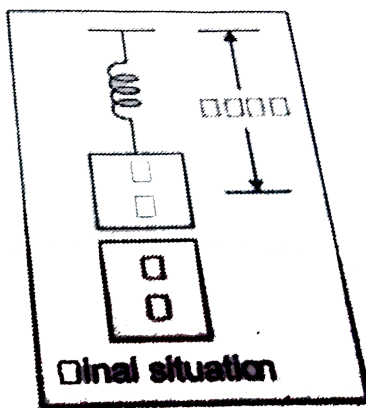
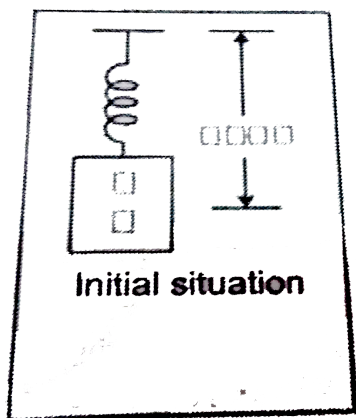
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22. Which of the following arrangements produces a stronger electromagnet and why?



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23. Consider a magnet which is hung to the hook of a spring as shown in figure. Then what could be the possible option from the following?



(i) X,A are North Pole and Y,B are south Pole

(ii) X, B are North Pole and Y,A are South Pole

(iii) A,B are South Pole and X,Y are North Pole

(iv) X,A are South Pole and Y,B are North Pole.

A. Only (ii)

B. Only (i)

C. Both (i) and (ii)

D. Both (ii) and (iii)

**Answer: A**



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## Assessment Test Test 1

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