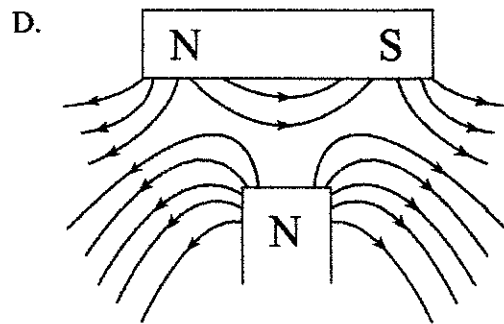
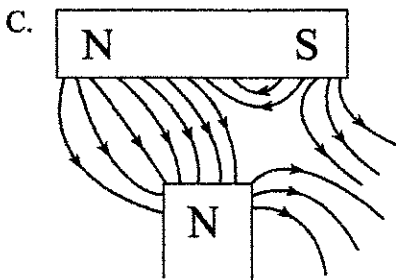
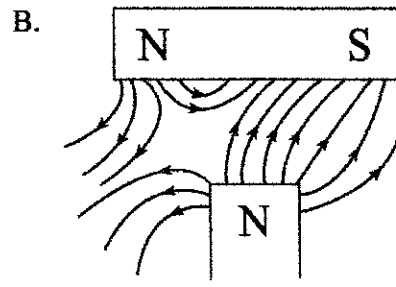
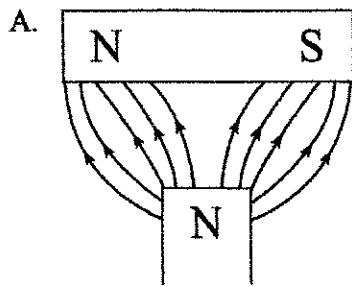
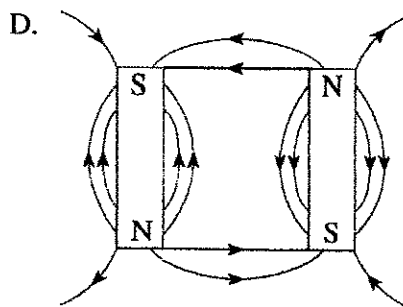
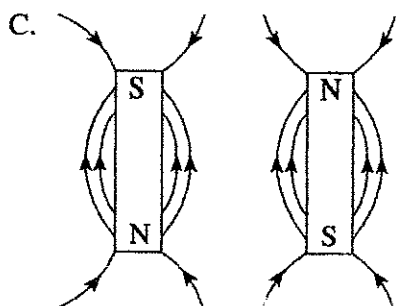
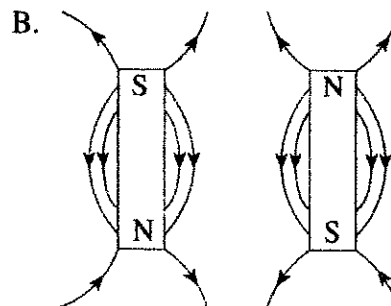
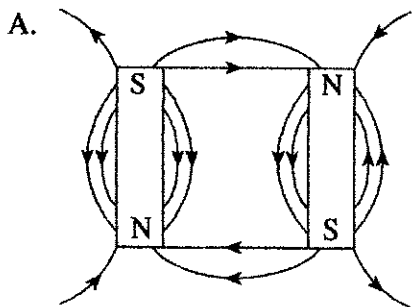


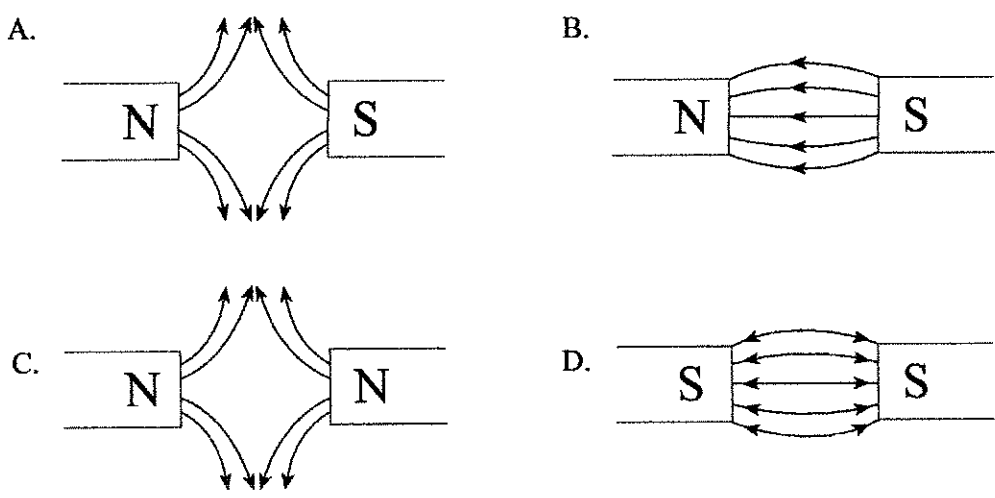
1. Which of the following diagrams best represents the magnetic field in the region between the two permanent magnets?



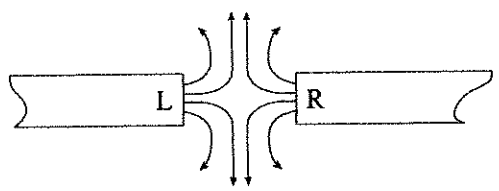
2. Which of the following best represents the magnetic field between two magnets?



3. Which of the following diagrams best shows the magnetic field lines between the poles of two permanent magnets?



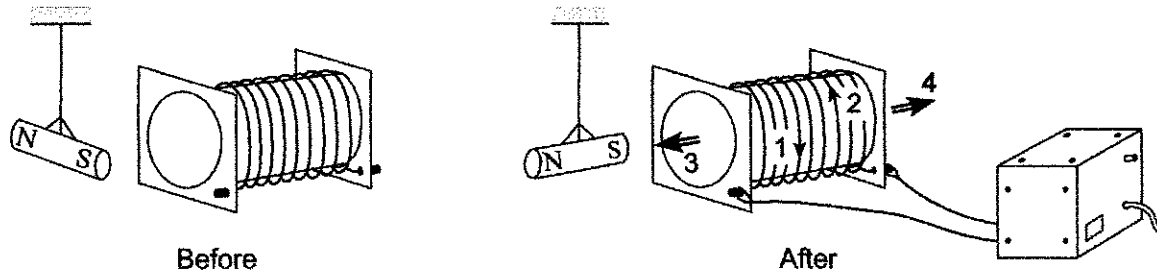
4. Identify the poles of the magnets shown.



	POLE L	POLE R
A.	North	North
B.	North	South
C.	South	North
D.	South	South

II.

1. The diagram shows a magnet suspended near a solenoid. After the solenoid has been connected to a power supply, the magnet rotates to a new position with its south pole pointing towards the solenoid.



Which arrows show the direction of the current in the solenoid and the direction of the magnetic field caused by this current?

	DIRECTION OF CURRENT	DIRECTION OF MAGNETIC FIELD
A.	1	3
B.	1	4
C.	2	3
D.	2	4

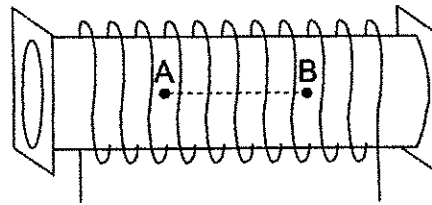
2. The diagram shows a conductor between a pair of magnets. The current in the conductor flows out of the page.



In what direction will the magnetic force act on the conductor?

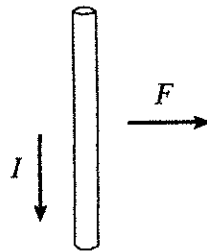
- A. up the page
- B. down the page
- C. towards the left
- D. towards the right

3. Which of the following best describes the magnetic field inside a current-carrying solenoid as you move from A to B.



	DIRECTION	MAGNITUDE
A.	constant	constant
B.	constant	changing
C.	changing	constant
D.	changing	changing

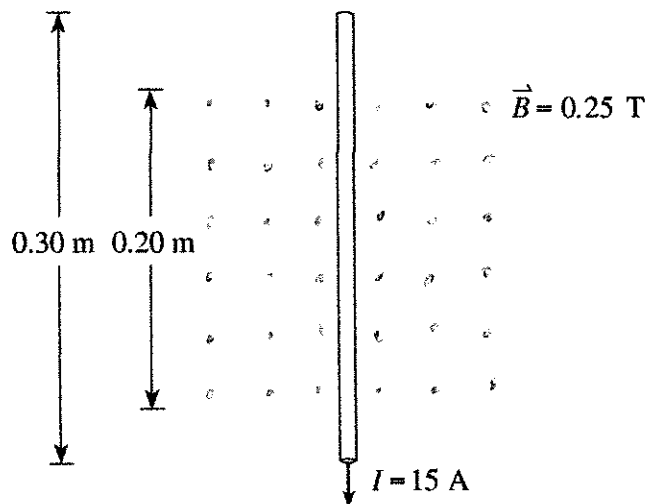
4. A section of conductor is carrying a current due south, as shown below.



Due to the presence of a magnetic field, the conductor experiences a magnetic force to the right. What is the direction of the magnetic field?

- A. left
- B. right
- C. into the page
- D. out of the page

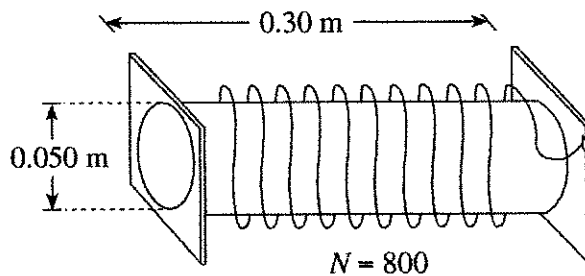
5. A conductor is placed in a magnetic field as shown.



What are the magnitude and direction of the magnetic force acting on this conductor when it carries a 15 A current?

	MAGNITUDE OF MAGNETIC FORCE	DIRECTION OF MAGNETIC FORCE
A.	0.75 N	To the left
B.	0.75 N	To the right
C.	1.1 N	To the left
D.	1.1 N	To the right

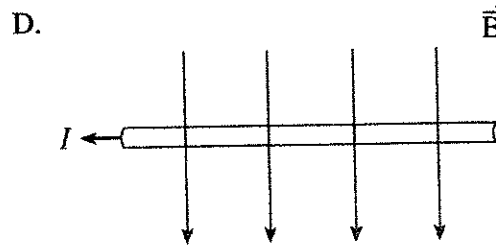
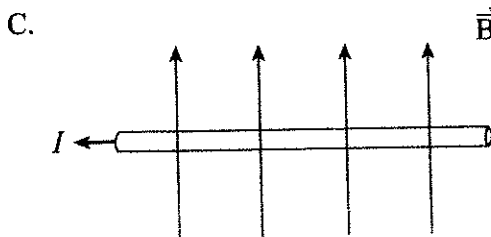
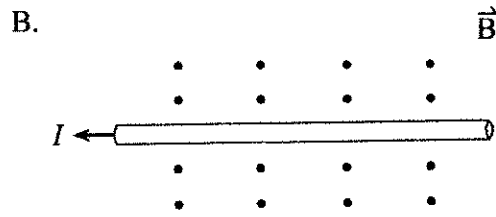
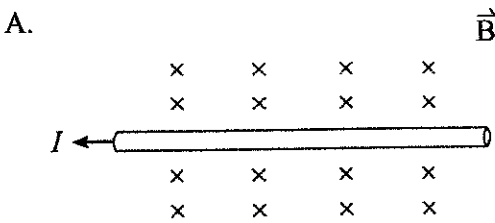
6. Consider the 800-turn solenoid shown in the diagram below.



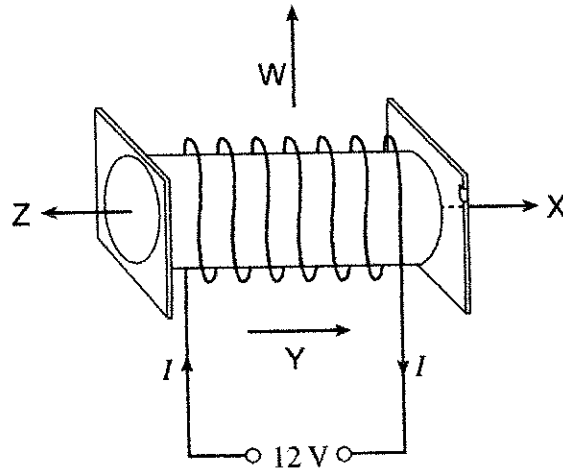
What is the current in the windings that would produce a magnetic field of 0.060 T at the centre of this solenoid?

- A. 3.0 A
- B. 8.0 A
- C. 18 A
- D. 290 A

7. In which diagram would the current-carrying conductor experience a magnetic force out of the page?

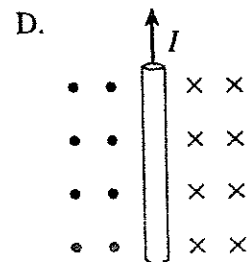
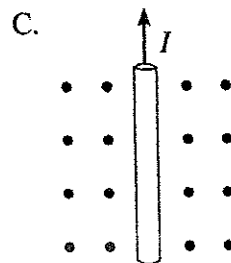
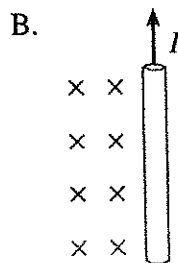
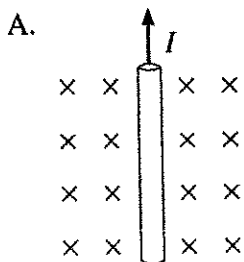


8. Which of the four arrows indicates the direction of the magnetic field when current flows in the solenoid shown below?

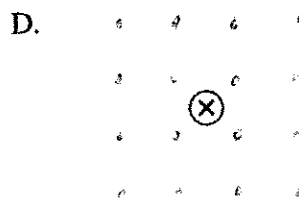
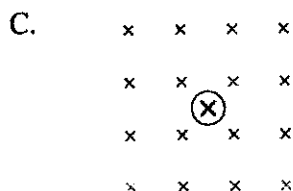
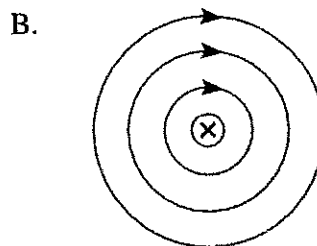
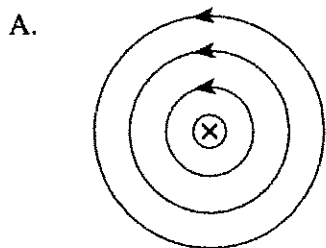


- A. W
- B. X
- C. Y
- D. Z

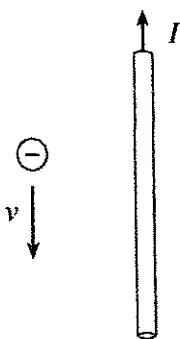
9. Which of the four diagrams below correctly depicts the magnetic field found on either side of a current carrying wire?



10. Which one of the following diagrams best illustrates the magnetic field produced by a current-carrying wire?



11. What is the direction of the magnetic force on an electron moving near a current-carrying wire as shown?

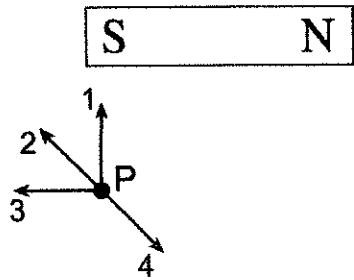


- A. left
- B. right
- C. into the page
- D. out of the page

12. A 0.25 m wire is perpendicular to a uniform 0.20 T magnetic field. What force is exerted on this wire when it carries a 15 A current?

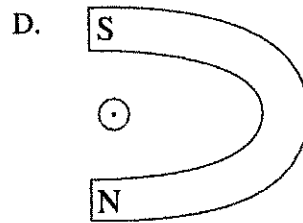
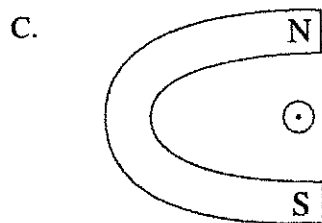
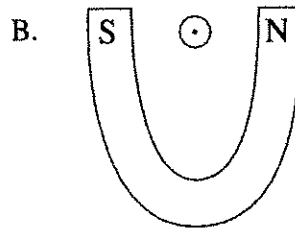
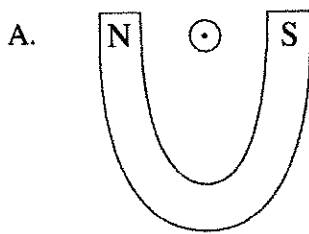
- A. 0.12 N
- B. 0.75 N
- C. 3.0 N
- D. 6.0 N

13. What is the direction of the magnetic field at point P due to the bar magnet?



- A. 1
- B. 2
- C. 3
- D. 4

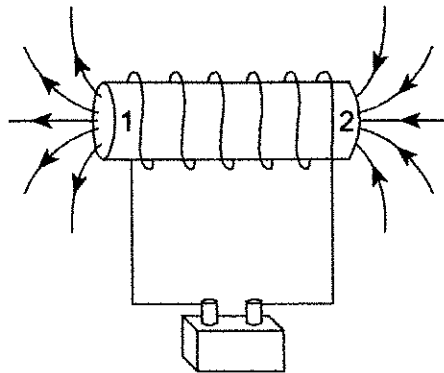
14. The diagrams below each illustrate a magnet and a conductor. In each case, the current in the conductor is out of the page. In which of these situations will there be a force on the conductor that points toward the top of the page?



15. A positively charged object ($q = 1.6 \times 10^{-19} \text{ C}$) is travelling at $1.9 \times 10^4 \text{ m/s}$ perpendicular to a $1.0 \times 10^{-3} \text{ T}$ magnetic field. If the radius of the resulting path is 0.40 m , what is the object's mass?

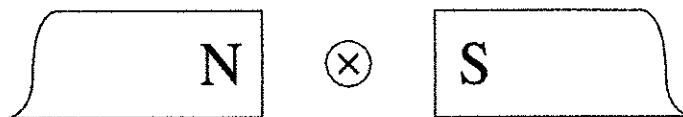
- A. $3.4 \times 10^{-27} \text{ kg}$
- B. $3.1 \times 10^{-19} \text{ kg}$
- C. $2.1 \times 10^{-9} \text{ kg}$
- D. 0.77 kg

16. Identify the magnetic poles 1 and 2 of the current-carrying solenoid in the diagram below.



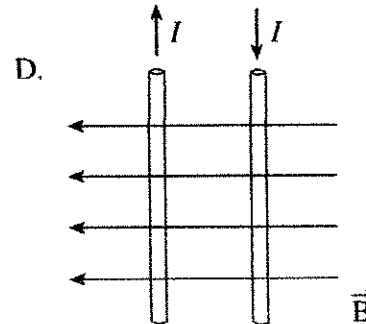
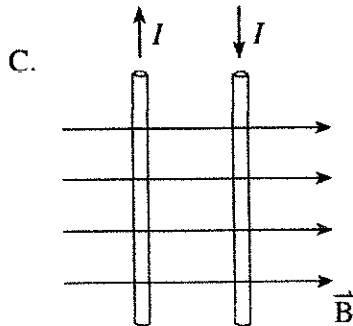
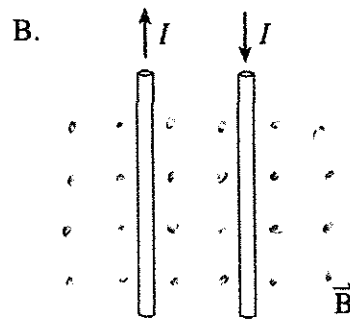
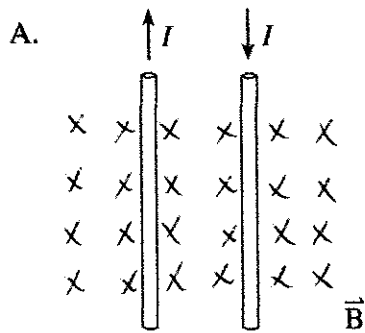
	POLE 1	POLE 2
A.	North	North
B.	North	South
C.	South	North
D.	South	South

17. Determine the direction of the magnetic force on the current-carrying conductor in the diagram below.

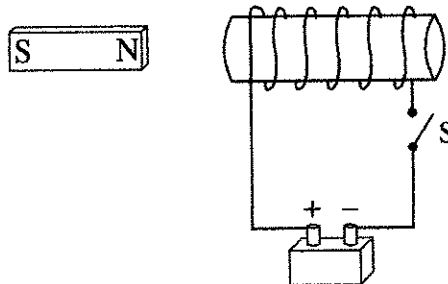


- A. Towards the left
- B. Towards the right
- C. Towards the top of the page
- D. Towards the bottom of the page

18. In which diagram would an **external** magnetic field, \vec{B} , cause two current-carrying wires to move towards one another?



19. A bar magnet is at rest, next to a fixed coil. When switch S is closed, the bar magnet will move

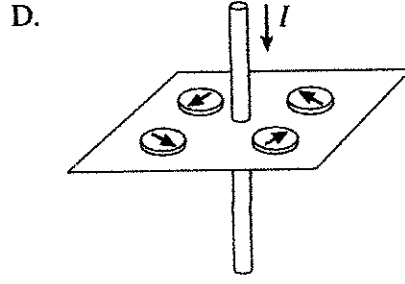
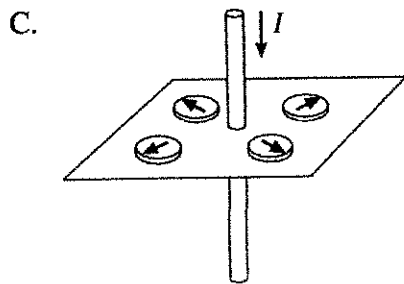
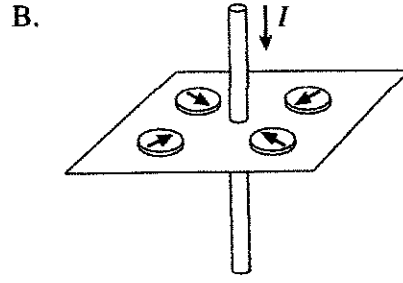
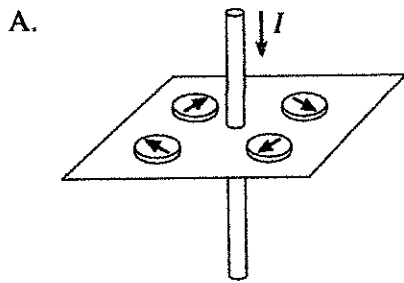


- A. to the left.
- B. to the right.
- C. up the page.
- D. down the page.

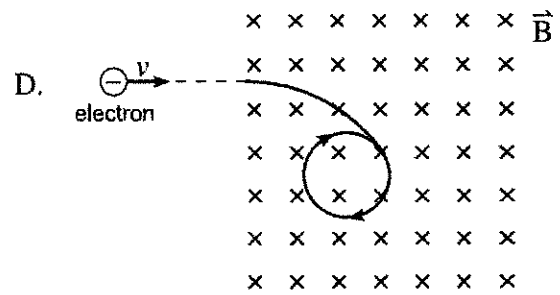
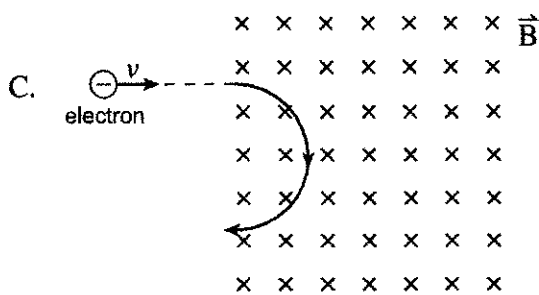
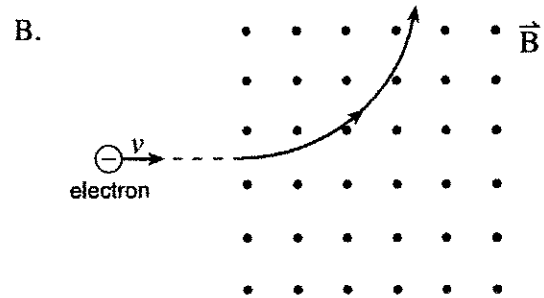
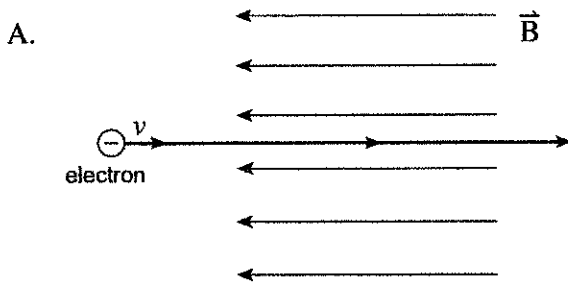
20. An electron travels at a speed of 1.4×10^4 m/s while following a circular path of radius 0.020 m perpendicular to a magnetic field. What is the strength of the magnetic field?

- A. 0.0 T
- B. 4.0×10^{-6} T
- C. 6.3×10^{-3} T
- D. 4.1×10^{-2} T

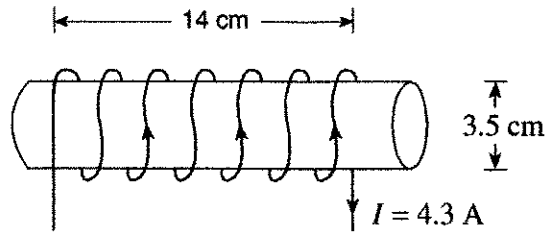
21. Which of the following diagrams best shows the orientation for a set of four compasses placed around a current-carrying wire?



22. An electron, travelling with a constant velocity, enters a region of uniform magnetic field. Which of the following is **not** a possible pathway?



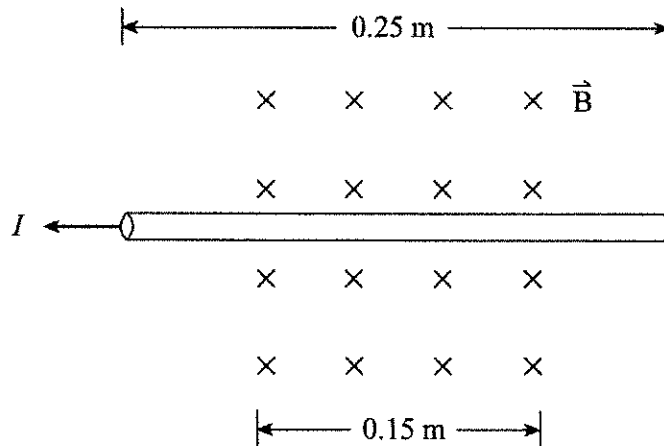
23. A current of 4.3 A flows through a solenoid. The 620-turn solenoid is 14 cm long and has a 3.5 cm diameter.



What are the direction and magnitude of the magnetic field inside the solenoid?

	DIRECTION OF FIELD	MAGNETIC FIELD STRENGTH (T)
A.	left	2.4×10^{-2}
B.	left	9.6×10^{-2}
C.	right	2.4×10^{-2}
D.	right	9.6×10^{-2}

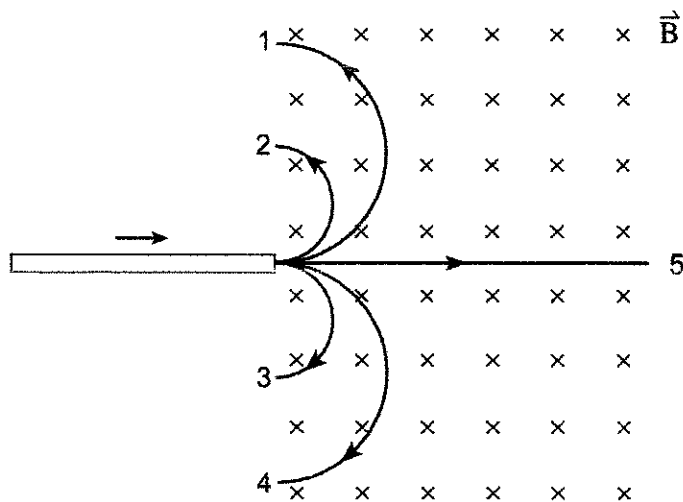
24. A wire carrying 12 A of current is placed in a magnetic field of strength 0.63 T.



What are the magnitude and direction of the magnetic force acting on the wire?

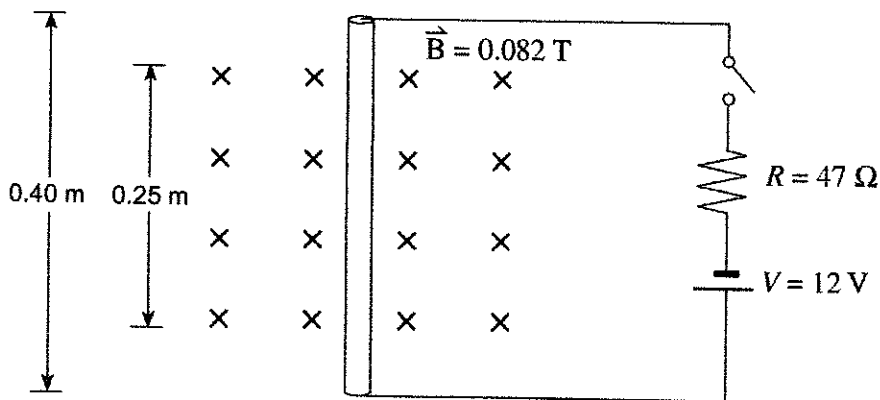
	FORCE	DIRECTION
A.	1.1 N	down the page
B.	1.1 N	up the page
C.	1.9 N	down the page
D.	1.9 N	up the page

25. A beam made up of ions of various charges and masses enters a uniform magnetic field as shown.



One type of ion is observed to follow path 2. Which path describes the one taken by an oppositely charged ion with twice the mass and twice the charge? (Assume all ions have the same speed.)

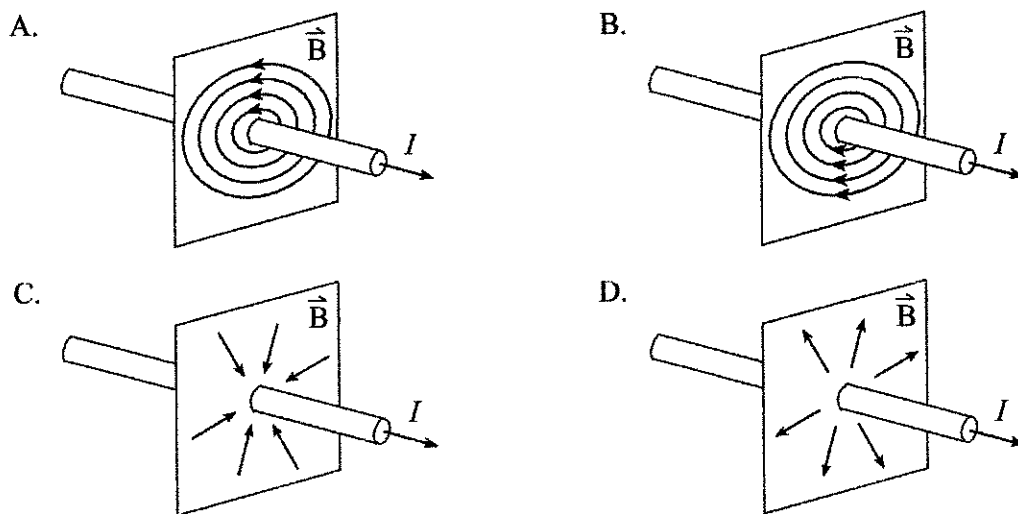
- A. Path 1
 - B. Path 3
 - C. Path 4
 - D. Path 5
26. A 0.40 m length of copper rod is held perpendicularly to a 0.082 T magnetic field as shown.



The copper rod is connected to a 12 V power supply and a 47 ohm resistor. What are the magnitude and direction of the magnetic force on the copper rod when the switch is closed?

	MAGNITUDE OF FORCE (N)	DIRECTION OF FORCE
A.	5.2×10^{-3}	left
B.	5.2×10^{-3}	right
C.	8.4×10^{-3}	left
D.	8.4×10^{-3}	right

27. Which of the following diagrams best shows the magnetic field due to a long straight wire carrying a conventional current I as shown?



28. A proton is travelling at 2.3×10^6 m/s in a circular path in a 0.75 T magnetic field. What is the magnitude of the force on the proton?

- A. 1.6×10^{-24} N
- B. 2.9×10^{-21} N
- C. 2.8×10^{-13} N
- D. 1.7 N

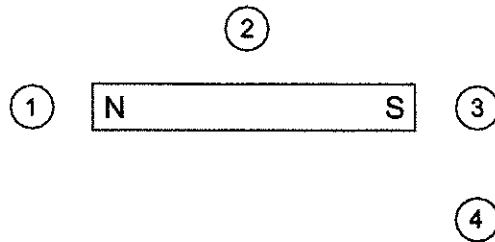
29. A particle having a charge of 3.2×10^{-19} C follows a circular path of 0.45 m radius while travelling at a speed of 1.2×10^4 m/s in a 0.78 T magnetic field. What is the mass of the particle?

- A. 7.8×10^{-28} kg
- B. 9.4×10^{-24} kg
- C. 1.1×10^{-19} kg
- D. 3.0×10^{-15} kg

30. A 460-turn solenoid having a diameter of 0.024 m is 0.14 m long. What is the magnetic field at the centre of the solenoid when a 13 A current flows through it?

- A. 0 T
- B. 5.4×10^{-2} T
- C. 3.1×10^{-1} T
- D. 6.3×10^{-1} T

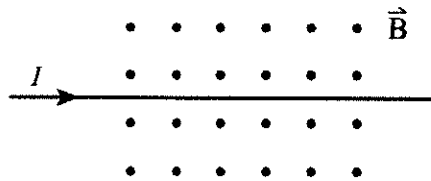
31. A compass is positioned at each of the following locations near a bar magnet.



In which location will the compass needle point to the right-hand side of the page?

- A. 1
- B. 2
- C. 3
- D. 4

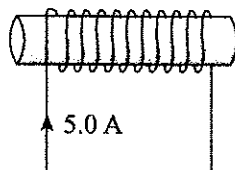
32. A current-carrying conductor is placed in a uniform magnetic field as shown.



What is the direction of the magnetic force on this conductor?

- A. Into the page
- B. Out of the page
- C. Towards the top of the page
- D. Towards the bottom of the page

33. A 5.0 A current flows through a 0.20 m long solenoid that contains 1 500 loops.



What are the magnitude and direction of the magnetic field at the centre of the solenoid?

	MAGNITUDE	DIRECTION
A.	9.4×10^{-3} T	left
B.	9.4×10^{-3} T	right
C.	4.7×10^{-2} T	left
D.	4.7×10^{-2} T	right