2.6 To identify the factors that affect the magnetic field of an electromagnet.

416 and 436 — *DME: Section 6.12*
SQ: pp. 163-165

Key Concepts:

1. The strength of an electromagnet is affected by these factors:

   - the current intensity (I) in the coil of the solenoid
   - the number of turns (loops) in the solenoid
   - the core material.

2. As the **current intensity** <u>increases</u> → **strength of field** <u>increases</u>.

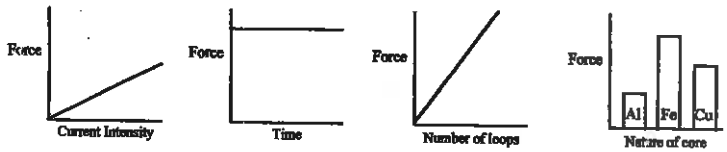
   As the **number of turns** <u>increases</u> → **strength of field** <u>increases</u>.

3. If both current intensity and number of turns change simultaneously,

   STRENGTH OF FIELD = (current intensity) x (number of turns)

SAMPLE QUESTIONS

1. Julie performed several experiments in the laboratory investigating the magnetic field produced by a solenoid. She plotted the following four graphs:



According to the graphs, which variables affect the strength of the magnetic field?

a) the current intensity, the time, the number of loops, and the nature of the core

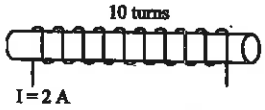
b) the time, and the number of loops only

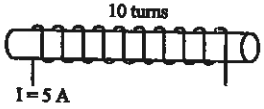
c) the current intensity, and the number of loops only

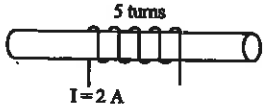
d) the current intensity, the number of loops, and the nature of the core only

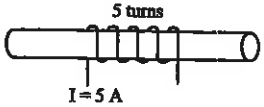
2. The diagrams below, illustrate electromagnets all consisting of the same core. One of these electromagnets produces a magnetic field that is more intense than that of all the others.

Which electromagnet is it?

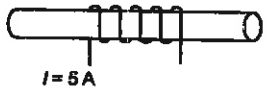
a)


c)


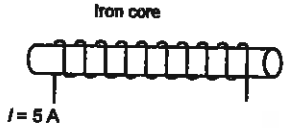
b)


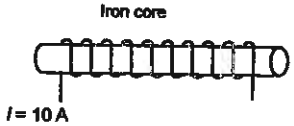
d)


3. Which of the following electromagnets produces the strongest field?

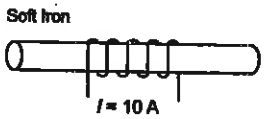
a)


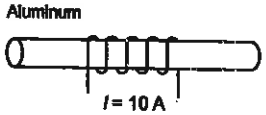
c)

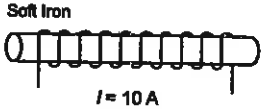

b)


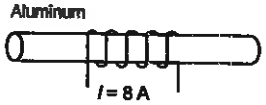
d)


4. The electromagnets illustrated below produce magnetic fields of different intensities. Which electromagnet produces the strongest field?

a)


c)


b)


d)


5. If you are making an electromagnet, which combination will produce the strongest magnetic field:

1. A solenoid with 100 turns
2. A solenoid with 200 turns
3. A current of 5 amperes
4. A current of 10 amperes

a) 1 and 3

b) 1 and 4

c) 2 and 3

d) 2 and 4

Additional Question: *SQ: p. 174, #11*

Key
1. D 3. D 5. D
2. C 4. B