

4.1 Simple phenomena of magnetism

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS magnet 磁体 • magnetic field 磁场 • magnetic material 磁性材料
 • permanent magnet 永磁体 • magnetism 磁学

Objective

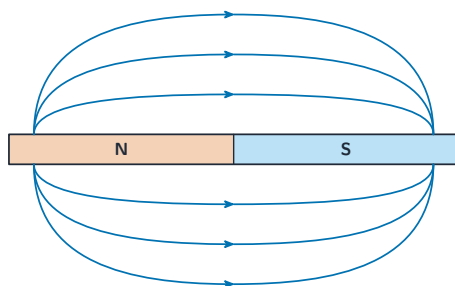
Build the skills to answer exam questions on **magnetism** 磁学 — poles and forces, **induced magnetism** 感应磁性, soft iron vs steel, and **magnetic fields** 磁场.

You must be able to:

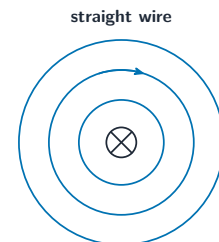
- use the rule of poles (like repel, unlike attract)
- compare soft iron (temporary) and steel (permanent) magnets
- draw and describe magnetic field lines

1 Worked examples

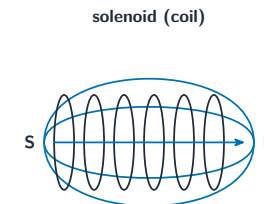
■ Fields and materials



Field lines come out of the N pole and into the S pole; closer lines = stronger field



straight wire
current into page;
field is circles round it



solenoid (coil)
field like a bar magnet

Soft iron magnetises easily but loses it (temporary); steel keeps its magnetism (permanent)

- like poles repel; unlike poles attract.
- magnetic materials: iron, steel, cobalt, nickel.

2 Practice

2.1 State what happens when the N pole of one magnet is brought near the N pole of another. [1]

2.2 State which is better for a permanent magnet: soft iron or steel. [1]

3 Exam-style questions

3.1 Magnetic field lines around a bar magnet point: [1]

A	B
C	D

A from S to N outside the magnet

B from N to S outside the magnet

C into both poles

D out of both poles

3.2 A piece of soft iron is placed next to a magnet.

(a) Explain why the iron becomes magnetised. [2]

(b) State why soft iron, not steel, is used for the core of an electromagnet. [2]

3.3 Describe how you could show the magnetic field pattern of a bar magnet using iron filings. [2]
