4. Electricity and magnetism

Starter Quiz · 课前小测

IGCSE Physics Name: _____ Score: _____

1. Two north poles are brought close together. They:

   ☐ do nothing

   ☐ attract (pull together)

   ☐ repel (push apart)

   ☐ swap to become south poles

2. Two negative charges attract each other.

   ☐ True ☐ False

3. A charge of 30 C flows past a point in 10 s. What is the current, in A?

   _____ A

4. A component has 12 V across it and a current of 3.0 A through it. What is its resistance, in Ω?

   _____ Ω

5. What happens to the resistance of a thermistor as it gets hotter?

   ☐ it stays the same

   ☐ it rises

   ☐ it falls

   ☐ it becomes infinite

6. Select **all** of these that are electrical hazards.

   ☐ damaged insulation (bare wires)

   ☐ damp conditions

   ☐ overloading a socket

   ☐ switching a lamp off

   Tick every correct option.

7. The magnetic field of a solenoid (a long coil carrying current) looks like the field of:

   ☐ no field at all

   ☐ a flat sheet

   ☐ a single point charge

   ☐ a bar magnet

8. How can you induce a current in a coil with a magnet?

   ☐ paint the coil

   ☐ warm the magnet up

   ☐ move the magnet in or out of the coil

   ☐ hold the magnet still inside the coil

9. A transformer works with a steady direct current (d.c.).

   ☐ True ☐ False

10. Which of these is a magnetic material (attracted by a magnet)?

    ☐ wood

    ☐ plastic

    ☐ iron

    ☐ copper

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Answers · 答案

IGCSE Physics

1. **repel (push apart)**

   Like poles repel. Only different poles (N and S) attract.

2. **False**

   Like charges repel; only different charges (+ and −) attract.

3. **3 A**

   $I = \dfrac{Q}{t} = \dfrac{30}{10} = 3.0$ A.

4. **4 Ω**

   $R = \dfrac{V}{I} = \dfrac{12}{3.0} = 4.0\ \Omega$.

5. **it falls**

   A thermistor's resistance falls as temperature rises – useful in temperature-sensing circuits.

6. **damaged insulation (bare wires); damp conditions; overloading a socket**

   Bare wires, overloading and damp all raise the risk of shock or fire. Switching a lamp off is normal, safe use.

7. **a bar magnet**

   A solenoid produces a bar-magnet-like field, with a north pole at one end and a south at the other.

8. **move the magnet in or out of the coil**

   A current is induced only when the field through the coil is changing – for example by moving the magnet.

9. **False**

   A transformer needs a changing magnetic field, so it works on a.c. only. A steady d.c. makes no change and induces nothing.

10. **iron**

    Iron (also steel, cobalt, nickel) is magnetic. Copper, plastic and wood are not.