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IGCSE PHYSICS 0625 · TOPICAL PAST PAPERS

Simple Magnetism & Magnetic Fields — Paper 1

Worked Answer Key (Multiple Choice)

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Simple Magnetism & Magnetic Fields — Paper 1 · Worked Answer Key

These are **Megalecture worked answers** for the topical multiple-choice compilation on **Simple Magnetism & Magnetic Fields (IGCSE Physics 0625, Paper 1)**. Every answer below was solved from first principles by the Megalecture team — covering the laws of magnetism, induced magnetism, magnetic materials and screening, field-line patterns, and the field around a current-carrying wire. Pay special attention to the field-direction diagrams: we use the law of poles (like repel, unlike attract) and the right-hand grip rule (thumb = current, curled fingers = field) throughout. The compilation is organised into three parts — keep your eye on the part heading, as the exam-paper question numbering restarts in each part.

Part A · Laws of Magnetism & Field Patterns

Q #	Exam reference	Answer	Brief working / reason
A1	M/J 16 P11	**D**	The magnet lies S (left) – N (right). A compass needle lines up along the field; the one shown points downward. That happens for a compass placed off the magnet's axis where the field curves down toward a pole — position **D**, below the magnet, fits a down-pointing needle.
A2	M/J 20 P11	**D**	Repulsion needs two **magnets** with **like poles facing**. A & B pair a magnet with iron/copper (only attraction or no force). C is N–S over S–N (unlike ends adjacent → attract). D places N facing N (S–N | N–S) → like poles repel → **D**.
A3	O/N 17 P11	**C**	Field lines run from N to S. The arrows point toward X (to the left), so lines leave Y and enter X. Lines come *out of* a N-pole and *into* a S-pole → Y = N, X = S → row **C**.
A4	O/N 17 P12	**B**	Magnet is N (top), S (bottom). The needle's N tip follows the field: above N it points up (A ✓), below S it points up into S (C ✓), on the left it points down (D ✓). On the right side the field points *down*, but B shows it pointing up → B is the **incorrect** one.
A5	O/N 18 P12	**A**	Between two like (N–N) poles the lines repel each other — none cross the gap; they curve sharply away leaving a neutral point. Only diagram **A** shows this divergent "pushing-apart" pattern.
A6	O/N 19 P11	**B**	Induced magnetism: an iron ball's face takes the *opposite* pole to the magnet end touching it. W's face = S ⇒ M_1's end at W = N ⇒ M_1's end at Y = S ⇒ Y's face = N. X's face to M_3 = S ⇒ M_3's end at X = N ⇒ M_3's end at Y = S ⇒ Y's other face = N. So Y shows **N and N → B**.
A7	O/N 19 P12		

Q #	Exam reference	Answer	Brief working / reason
		B	The single field line leaves P (loops up and back), so lines come *out* of P → P = N. The line then runs from P toward Q and enters Q → lines go *into* Q → Q = S. Hence P = N, Q = S → row **B**.

Part B · Magnetic Properties of Matter

Q #	Exam reference	Answer	Brief working / reason
B1	M/J 17 P11	**D**	A magnet attracts *any* magnetic material, so attraction alone is not proof. Only a magnet can **repel** another magnet's pole → "It repels one end of another magnet." → **D**.
B2	M/J 17 P11	**B**	Magnetic shielding needs a soft magnetic material that draws the field lines into itself and around the cavity. Of the options that is **iron** → **B**.
B3	M/J 17 P12	**B**	A magnet is demagnetised by placing it inside a coil carrying **alternating current** (the reversing field randomises the domains). The a.c. method is option **B**.
B4	M/J 19 P11	**B**	The clips hang by *induced* magnetism. **Soft iron** loses its magnetism almost completely once the inducing magnet is removed, so the chain collapses → "soft-iron clips become demagnetised when the magnet is removed." → **B**.
B5	M/J 19 P12	**B**	Bar 1 (X) is attracted to *both* poles → it is unmagnetised magnetic material = **iron**. Bar 2 (Y) is attracted to N but repelled by S → it is itself a permanent magnet = **steel**. So bar 1 = iron, bar 2 = steel → **B**.
B6	O/N 16 P11	**D**	Screening works only with a magnetic material that channels stray field lines around the instrument: **soft iron, because it is a magnetic material** → **D**.
B7	O/N 17 P11	**A**	A soft-iron shield does not block or absorb the field — it provides an easy path that **channels the field lines around** the device, so they re-emerge on the far side → **A**.
B8	O/N 20 P11	**D**	The iron wall becomes magnetised by the bar magnet sitting inside it; this is **magnetic induction** (induced magnetism), not any electrical effect → **D**.

Part C · Electromagnetism (Field of a Current)

Q #	Exam reference	Answer	Brief working / reason
C1	M/J 18 P11	**A**	While P is connected the electromagnet holds the armature up. Disconnecting P switches the electromagnet off, so the armature

Q #	Exam reference	Answer	Brief working / reason
			falls; falling closes the separate bell circuit, so the bell **rings** → row **A** (fail-safe alarm).
C2	M/J 18 P11	**A**	Field lines around a straight wire are concentric circles. Right-hand grip rule: current *into* the page → field is **clockwise**. The top arrow of diagram **A** points right (clockwise), so A shows the correct shape and direction.
C3	M/J 19 P11	**C**	The compass sits just below the "into-card" wire and just above the "out-of-card" wire. Grip rule: below the into-card wire the field points **left**; above the out-of-card wire the field also points **left**. The two add, so the needle points left → **C**.
C4	M/J 20 P11	**D**	The magnet is clamped (fixed). The varying current in the coil makes the coil experience a varying force, so the **coil moves**; the cone is fixed to the coil and moves with it, pushing the air. So **coil and cone** vibrate → **D**.
C5	O/N 17 P12	**A**	Current is into the paper, so by the grip rule the field is **clockwise**. Increasing the current strengthens the field, so the lines **move closer together** → "clockwise, lines move closer together" → **A**.

Note from Megalecture. Watch the field-direction items (C2, C3, C5 and A3/A4): always fix the current direction first, apply the right-hand grip rule, then read off the arrow. For the law-of-poles questions, remember that *attraction is not proof of magnetism* — only repulsion is. These are original Megalecture worked solutions prepared for revision use.