Magnetism and Electromagnetism

These questions are made from the specification. This means that if you understand all of this content then you cannot be asked anything else. Print off the pdf and have a go at all the questions.

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Poles of a Magnet

Most of the answers to these questions can be found on Page 68 of the AQA GCSE Physics Specification.

1. Where on a magnet are the magnetic forces the strongest? A nice and easy one to start!
2. What happens when two magnets are brought close together.
3. What do two like poles do to each other? e.g a North and a North.

4. What do two unlike poles do to each other? e.g. a North and South pole.
5. What is your understanding of a non-contact force?
6. What is the difference between a permanent magnet and an induced magnet?
7. Copy and Complete the following paragraph.

Induced magnetism always causes a force of

_____. When removed from the magnetic field an induced

magnet loses most/all of its magnetism _____.

Magnetic Fields

1. Name four magnetic materials.
2. Define the terms magnetic field.
3. Is the force between a magnet and a magnetic material always repulsive or attractive?
4. How does the strength of a magnetic field depend on the distance from a magnet?
5. Where are the strongest parts of a bar magnet?
6. Copy and complete the following:- The _____ of a magnetic field line is from the _____ (seeking) pole of a magnet to the _____ pole of the magnet.
7. How can the direction of a magnetic field be decided?
8. What does a magnetic compass contain?
9. Have a rest for ten minutes.
10. Where does the needle of a magnetic compass point in the Earth's magnetic field?
11. How can you plot the magnetic field around a bar magnet using a small plotting compass?

12. Draw the magnetic field around a bar magnet. Label where the field is strongest and weakest. How can you tell from the spacing of the magnetic field lines?
13. How is a direction represented on the magnetic field lines?
14. Which part of the Earth is magnetic?

Electromagnetism

1. When a current flows through a conductor what is produced around it?
2. What does the strength of a magnetic field around a current-carrying depend on? State two things.
3. How can the right-hand grip rule be used to decide the direction of the magnetic field lines around a current-carrying wire?
4. How can a wire be shaped so that it forms a solenoid?
5. What does shaping into a solenoid do to the strength of a magnetic field?
6. How would you describe the magnetic field inside a solenoid?
7. Is the magnetic field around a solenoid similar to that of a bar magnet?
8. What does an iron core do to the strength of a solenoid?
9. Where would you place the iron for it to be a 'core'?
10. What is another name for a solenoid with an iron core?
11. Find a diagram of an electric bell and explain how it works.
12. Find a diagram of a relay switch and explains how it works.

Flemings Left Hand Rule and The Motor Effect

1. What happens when a conductor carrying a current is placed in a magnetic field?
2. What is this effect called?
3. In Fleming's left-hand rule what do the thumb, first finger and second finger represent?
4. What are the factors that affect the size of the force on a conductor?
5. This equation is for a conductor at right angles to a magnetic field and carrying a current:

$$force = magnetic\ flux\ density \times current \times length$$

$$[\ F = B\ I\ l\ ]$$

6. What is the unit of force?
7. What is the unit of magnetic flux density?
8. What is the unit of current?
9. What is the unit of length?
10. Rearrange the equation so that force =, current =, length = and magnetic flux density =

The Electric Motor

1. Describe the motion of a coil of wire in a magnetic field?
2. Consider the current in the two long sides of the coil of wire and Fleming's left-hand rule to explain how the electric motor rotates.

Loudspeakers

1. Explain how a moving coil loudspeaker works. (use the motor effect to explain your answer).
2. Explain how a moving-coil headphone works. (use the motor effect to explain your answer)

The next sections do not need to be revised if you are taking combined science. These are for SEPARATE PHYSICS ONLY.

Induced Potential - Physics Only

1. What happens if an electrical conductor moves relative to a magnetic field?
2. What happens if there is a change in the magnetic field around a conductor?
3. What happens if the conductor is part of a complete circuit?
4. What is this effect called?
5. Copy and complete the following. This is quite a hard concept.
   An _____ *current generates a* _____*that opposes the original change, either the* _____*of the conductor or the* _____ *in magnetic field.*
6. What are the factors that affect the size of the induced potential difference or induced current?
7. What are the factors that affect the direction of the induced potential difference or induced current?

The Generator Effect - Physics Only

1. What effect is used in alternators and dynamos?
2. What type of electricity does a generator make?
3. What type of electricity does a dynamo make?
4. Can you draw a graph to show the induced potential difference against time for an alternator?
5. Can you draw a graph to show the induced potential against time for a dynamo?

Microphones - Physics Only

1. How do microphones convert sound waves into electrical signals? Explain your answer in terms of the generator effect.

Transformers - Physics Only

1. Draw a labelled diagram of a transformer.
2. Why is iron used for its core?
3. Copy and complete the following: The _____ of the potential _____ across the primary and secondary coils of a transformer Vp and Vs depends on the _____ of the number of turns on each coil, np and ns .
4. What do p and s represent in question 63?

5. Have a look at this equation? $\left[\frac{v_p}{v_s} = \frac{n_p}{n_s} \right]$
6. What does the vp stand for?
7. Rearrange the equation four ways so that each term is the subject of the equation.
8. What is the difference between a step up and a step-down transformer?
9. If a transformer was 100% efficient then what could you say about the power in and power out?
10. What is the equation to calculate electrical power in terms of current and potential difference?
11. What is the unit of electrical power?
12. Look at this equation. $V_s \times I_s = V_p \times I_p$
13. Can you explain what this means? What is on the left-hand side and what is on the right-hand side of the equation?
14. If the potential difference is stepped up what happens to the current in the secondary coil? Why is the useful in terms of the transmission of power across the power lines that make up the national grid?
15. If the potential difference is stepped down what happens to the current in the secondary coil?
16. Why is an alternating current used across the primary coil?
17. How is an alternating current induced across the secondary coil? Explain this in terms of a changing magnetic field.