Answers to GCSE Physics Questions on the Smart Speaker

1. Electrical energy is usefully transferred into sound energy.
2. Some electrical energy is dissipated as thermal energy because components have resistance.
3. A potential difference is needed to push charge around the circuit and make current flow.
4. P = IV = 1.8 × 12 = 21.6 W
5. E = Pt = 24 × 900 = 21600 J
6. P = E ÷ t = 18000 ÷ 600 = 30 W
7. Plastic is used because it is an electrical insulator and is lightweight.
8. Copper is suitable because it is a good electrical conductor.
9. The vibrating cone makes air particles vibrate, producing compressions and rarefactions.
10. A longitudinal wave has vibrations parallel to the direction of wave travel.
11. 80 Hz has a lower pitch because it has a lower frequency than 800 Hz.
12. The amplitude increases and more energy is transferred by the sound wave.
13. $v = f\lambda = 400 \times 0.85 = 340$ m/s
14. t = d ÷ v = 6.8 ÷ 340 = 0.020 s
15. Sound cannot travel through a vacuum because it needs particles to vibrate.
16. Sound energy is transferred into electrical energy.
17. The current-carrying coil experiences a force in the magnetic field.
18. Changing the current direction changes the force direction, so the cone moves backwards and forwards.
19. F = BIL = 0.32 × 2.5 × 0.18 = 0.144 N
20. Sound waves are longitudinal and need a medium, while Wi-Fi waves are transverse electromagnetic waves and can travel through a vacuum.