I, V, & Q Questions for A-level Physics

1. What is electric charge, and what is its SI unit?

2. Define electric current. What is its SI unit?

3. What is potential difference (voltage) in a circuit? State its unit.

4. How are charge, current, and time related in a circuit?

5. What is the charge on a single electron?

6. A circuit has a current of 2 A. How much charge flows through the circuit in 10 seconds?

7. Explain the difference between conventional current and electron flow.

8. A current of 1.5 A flows through a conductor for 120 seconds. How much charge has flowed through the conductor?

9. What is the potential difference between two points if 15 J of energy is required to move 3 C of charge between them?

10. Explain why current is the same at all points in a series circuit.

11. If a charge of 5 C moves through a circuit with a potential difference of 20 V, how much energy is transferred to the charge?

12. What is the definition of one volt, and how does it relate to energy and charge?

13. A battery transfers 120 J of energy to 4 C of charge. Calculate the potential difference across the battery.

14. A current of 0.8 A flows through a wire for 10 minutes. Calculate the total charge transferred through the wire during this time.

15. How much energy is transferred by a 12 V battery when a current of 2 A flows for 5 minutes?

16. In a time of 2 minutes, a current of 4 A flows through a section of a circuit. If the energy transferred during this time is 720 J, determine the potential difference across the circuit.

17. A lightning strike transfers a total charge of 30 C to the ground in a time interval of 50 milliseconds. Calculate the average current produced by the lightning strike

18. If a charge of 50 μC is placed in an electric field where the potential difference between two points is 500 V, calculate the work done in moving the charge between the two points.

19. Derive the formula P=VI for the power dissipated in an electrical component.

20. A beam of charged particles carries a total charge of 25 C per second. If the potential difference applied across the beam is 250 V, calculate the total power delivered by the beam of particles.