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Answers to NCERT/CBSE PHYSICS Class 12(Class XII)textbook Exercise and Additional exercise

CHAPTER THREE

CURRENT ELECTRICITY

EXERCISES

(For simplicity in numerical calculations, take g = 10 m s-2)

3.11 A storage battery of emf 8.0 V and internal resistance 0.5 O is being charged by a 120 V dc supply using a series resistor of 15.5 O. What is the terminal voltage of the battery during charging? What is the purpose of having a series resistor in the charging circuit?

3.11 Key Idea

While charging the positive terminal of the dc supply is connected to the positive terminal of the battery.

Using Kirchoffs' rules $(120-8) = I(15.5+0.5)$

I = 7 A

Terminal voltage of battery V = E + Ir = 8 + 7 (0.5) = 11.5 V

Note the plus sign used. This is because current is made to flow across the battery, during charging, from its +ve terminal to its −ve terminal.