Excel Coaching Classes

Date: 12-Jun-2026
Time: 60min

Current Electricity

Marks: 20

SECTION A

Q.1 **Select and write the correct answer for the following multiple choice type of questions:** **(3)**

i Which of the following equations gives correct expression for the internal resistance of a cell by using potentiometer?

(A) $r = R\left(\frac{V}{E} - 1\right)$ (B) $r = R\left(1 - \frac{E}{V}\right)$

(C) $r = R\left(1 - \frac{V}{E}\right)$ (D) $r = R\left(\frac{E}{V} - 1\right)$

ii A metrebridge cannot be used to determine

(A) resistance of a wire. (B) specific resistance.

(C) conductivity. (D) e.m.f of a cell.

iii In a potentiometer experiment, balancing length for first cell and second cell are 2.5 m and 2 m respectively, when cells are used separately. Hence E_1/E_2 is _____.

(A) 0.8 (B) 1

(C) 1.1 (D) 1.25

Q.2 **Answer the following questions:** **(3)**

i Define Potential Gradient.

ii What is the value of resistance for an ideal voltmeter?

iii What is shunt?

SECTION B

Attempt any TWO questions of the following: **(4)**

Q.3 A set of three coils having resistances 10 Ω, 12 Ω and 15 Ω are connected in parallel. This combination is connected in series with series combination of three coils of the same resistances. Calculate the total resistance and current through the circuit, if a battery of e.m.f 4.1 volt is used for drawing current.

Q.4 State any two sources of errors in metrebridge experiment. Explain how they can be minimized.

Q.5 Distinguish between a potentiometer and a voltmeter.

Q.6 **(A)** How can a galvanometer be converted into a voltmeter?

(B) In a Wheatstone's metrebridge experiment, the null point is obtained in middle one third portion of wire. Why is it recommended?

SECTION C

Attempt any TWO questions of the following: **(6)**

Q.7

Obtain the balancing condition in case of a Wheatstone's network.

Q.8 State and explain Kirchhoff's voltage law in electric circuit. State their sign conventions.

Q.9 When a resistance of 12 ohm is connected across a cell, its terminal potential difference is balanced by 120 cm length of potentiometer wire. When the resistance of 18 ohm is connected across the same cell, the balancing length is 150 cm. Find the balancing length when the cell is in open circuit. Also calculate the internal resistance of the cell.

SECTION D

Attempt any ONE question of the following: **(4)**

Q.10 Describe how a potentiometer is used to compare the emfs of two cells by connecting the cells individually.

Q.11 **(A)** Explain: Kirchhoff's current law is based on the law of conservation of charge.

(B) A galvanometer has a resistance of 25 Ω and its full scale deflection current is 25 μA. What resistance should be added to it to have a range of 0 – 10 V?